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# SOME DENDROLOGIC COMMENTS ON STEYERMARK'S "FLORA OF MISSOURI"

Kendall Laughlin
165 Pine Ave., Chicago, Ill.

This magnum opus of 1800 pages, embellished by hundreds of excellent drawings, is the result of thirty years of work by Julian Alfred Steyermark, Ph.D.

Most of the descriptions do not state whether the leaves are alternate or opposite. This information can apparently be gleaned from the General Key, but only after a long search for the family. A single line beneath the name of the genus "Monoecious--dioecious--herbs--shrubs--trees--with--alternate--opposite--leaves" would have been worth while.

P. 530--Fagus grandifolia. Steyermark does not recognize the type species of the Beech in Missouri. There are nevertheless trees in southeastern Missouri with cuneate leaves like the type species. There is such a native tree 4 feet 9 inches in circumference between the driveway and a side street beside Marvin Lepchenske's home at 124 S. Locust Street, Dexter.

On p. 544 Steyermark does not recognize the variety leucophylla as distinct from Quercus falcata var. pagodaefolia. It seems to me that much of the confusion between these two varieties has come about because Ashe's description of leucophylla stated that the undersurface of the leaves was whitish (according to Deam, Trees of Indiana, p. 163). (I confess that I have had to change some of my ideas as the result of study of recently collected leaves.) It is my observation and that of others (Sargent and Moore) that the tomentulum of the undersurface of the leaves shaped like leucophylla is brownish or light grayish-russet turning brown in age. The leaves of leucophylla have fewer, broader lobes than pagodaefolia. While the two varieties often intergrade, I prefer to recognize them as distinct, as Moore has done in his Trees of Arkansas (p. 53). Some trees of leucophylla have bark like the White Oak. There are two very typical trees of this variety on the west side of Selma Street 175 feet south of Main Street in Poplar Bluff and near the southwest corner of the town hall square in Dexter.

P. 547. Steyermark does not mention the concentric circles around the apex of the acorn-nut of Quercus coccinea, which I think is the most distinctive

character of the species.

Steyermark recognizes Q. coccinea var. tuberculata, but expresses a little skepticism, as if he had not seen the variety in Missouri. There are two well marked trees in Dr. A. L. May's yard in the 1100 block of Cynthia Street in Poplar Bluff, which have tuberculate acorn-cups 25-28 mm. wide. There should be no doubt about the distinctiveness of tuberculata in Missouri, Illinois, etc.

I think that the occurrence of Quercus Nuttallii (p. 551) in Missouri should be investigated. I explored Mud Creek on November 8, 1964, but could not find anything that looked like Q. Nuttallii. I had been informed that the late Joe Adamson's property was owned by Leland Linvil, but local residents gave me conflicting information about where Mr. Linvil lived. If any living person has actually seen Nuttallii, identified by leaves and acorns, anywhere in Missouri or Arkansas during the past decade, I should like to be informed of the exact location. I have seen much misinformation about it and instances of confusion with coccinea and palustris.

I found it well-nigh impossible to convince Steyermark of anything about a hybrid Oak. I gave him a photograph, leaves and acorns from a very good specimen of Q. Xtridentata just south of Swope Park in Kansas City (now owned by Minnie Nutting of Malta Bend, Mo.), which is the Missouri champion shown on p. lxxxii, but he blandly states on p. 542 that this hybrid is "known definitely only from Cape Girardeau Co."

I gave him leaves and acorns from five specimens of Q. Xmutabilis in Miquoria. He shows its occurrence in Mississippi Co. on p. 550 and does not mention my name. See PHYTOLOGIA 6:374-378.

In Map 763 on p. 538 "Quercus XHillii" should read "Quercus XSchuettei," the name approved by him. There is another inconsistency here,--squares are shown for this hybrid in Jackson, Johnson and St. Clair Counties, but in the text he says XSchuettei is found only in St. Clair County. Just recently I found a new champion in Swope Park, Kansas City, Jackson Co., with a circumference of 5 feet 9 inches and a height of 66 feet.

In Map 766 on p. 540 the "x" for Quercus XEgglestonii should be spotted in Jackson Co. instead of Bates Co.

Since this book was compiled, I have described in PHYTOLOGIA Q. Xdiscreta (Shumardii X velutina), Q.

Xmegaleia (lyrata X macrocarpa) and Q. Xriparia (rubra X Shumardii Schneckii) from Missouri. I recently described in PHYTOLOGIA 9:488-495 Q. Xcolumnaris (palustris X rubra) from a tree now in Chicago; on p. 547 Steyermark mentions this hybrid as having been found in Osage and Benton Cos.

As Steyermark states on p. 556, Celtis is greatly in need of a revision in Missouri.

The species occidentalis and laevigata can be distinguished in the field by their bark. The bark of occidentalis is almost entirely covered with excrescences; the bark of laevigata is lighter colored, smooth and only partly covered with excrescences.

In Miquoria there is a kind of Celtis that is distinctly shrubby and with Cornus Drummondi, Rhus radicans and Arundinaria gigantea it forms a dense understory. The specimen that I have has leaves more than twice as long as wide reaching a length of 7 cm., rounded and nearly symmetrical at the base, acuminate at the apex, 3-nerved, dull yellow green on both surfaces, scabrous above, quite thin, definitely toothed above the middle with short narrow teeth smaller than in occidentalis, the petioles, 5-7 mm. long, and the lower part of the midrib are densely villous, and the branchlets are very slender and hoary-villous. I always regarded this shrubby type of Celtis as the dwarf hackberry and it is certainly an important constituent of the Mississippi River bottoms. Steyermark, however, does not show the shrubby species tenuifolia in Map 785 as being found east of Crowley's Ridge; nor do the characters of my plant fit Steyermark's description of tenuifolia. While the vegetative characters of my plant fit his general description of laevigata except for its small size, it does not fit any of his descriptions of the varieties, so that there seems to be doubt about its identity.

Pages 796 to 799--PYRUS--MALUS

Steyermark uses the generic name Pyrus for the Apples and Crab Apples. Malus is the name approved in the International Code of Botanical Nomenclature, p. 195.

Steyermark shows that the anthers of ioensis and coronaria are red. This is not correct according to my observation. The anthers of all specimens of ioensis that I have observed were moderate orange yellow. There are twenty sheets of specimens of ioensis from Missouri in the herbarium of the Chicago Natural History Museum but not a single sheet shows the color of the anthers. This is a very important character that

has been generally overlooked by most taxonomists.

The color of the anthers of coronaria is also orange yellow. But the color of the anthers of lancifolia is deep pink or reddish pink.

Steyermark shows that coronaria var. coronaria is found in Clay, Jackson, Saline, Texas, Madison and Butler Counties.

There are no specimens in the herbarium of the Chicago Natural History Museum to verify this. There is a specimen from Jackson Co. labeled coronaria collected by B. F. Bush at Independence in 1899, his No. 130. The leaves are rounded at the base, 7 cm. long, 3.1. cm. wide. The specimen is obviously lancifolia.

The book shows that coronaria but not lancifolia is found in Clay Co. In September of 1963 I found a large colony of lancifolia on Rudolph Schmidt's farm in Kansas City North in Clay Co. The largest tree is a new A.F.A. champion and has a circumference of 2 feet 7 inches and a height of 20 feet. A week later I found several large trees in a lot on the west side of the 5300 block of North Winchester Avenue in Kansas City North. All these trees were typical lancifolia and could not possibly be mistaken for coronaria. It is inconceivable that anyone making a careful survey of Clay Co. could have listed coronaria without listing lancifolia.

I feel certain that coronaria var. coronaria is not found in Jackson and Clay Cos. Perhaps it is found rarely in uplands in southeastern Missouri. It is an Eastern species.

The reader is referred to my monograph on lancifolia in PHYTOLOGIA 9:108-112. I have broadened three of the characters of the Key shown on p. 111 of that article to read as shown below, based on study of additional material:

| WEIGHT | CHARACTER | MALUS LANCIFOLIA | MALUS CORONARIA |
|---|---|---|---|
| 5 | Leaf Blades: Dimensions | Averaging 49% to 60% as wide as long. | Two-thirds to four-fifths as wide as long. |
| 1 | Color above | Moderate yellow green or olive green. | Dark greenish yellow or dark yellow. |
| 7 | Anthers | Deep pink or reddish pink. | Orange yellow. |

Being a splitter on Crataegus, I rejoice in the 50 species that E. J. Palmer recognizes on pp. 802-822, mostly in southern Missouri, tho I know nothing about them. But in working out this genus for Gleason and Cronquist's "Manual of Vascular Plants" the same man recognized only 21 species worthy of descriptions east of the Missouri River. This condensed treatment is far too crude and inaccurate for the Chicago region, where there are at least 26 species.

The drawing of C. Marshallii, No. 3 on p. 807, is incorrect. There is typically a deep narrow sinus above the lower lobe, as shown in Gray's Manual and B&B.

I am glad that Steyermark differentiates Prunus lanata (=mexicana) from americana on pp. 856-858. I have observed for decades that the fruit of lanata is bluish--perhaps purplish blue--and different from the red fruit of americana. This difference has been ignored and misstated in many books.

In describing the Pumpkin Ash on p. 1179 Steyermark does not mention the length of the calyx on the samaras, which is 6 mm. in Miquoria (when they can be found), contrasted with 1 mm. for the Green Ash. There seems to be an introgressive hybridization of the Pumpkin Ash into the Green Ash in Miquoria. In 1957 I found a Pumpkin Ash 90 feet tall near the entrance with samaras on one side of the tree like the Pumpkin Ash and on the other side like the Green Ash. Where xenogamy takes place in the Melioides Subsection of Fraxinus, the fruit is not very reliable.

# MATERIALS TOWARD A MONOGRAPH OF THE GENUS LIPPIA. I

Harold N. Moldenke

This is the twenty-ninth in my series of works of monographic nature on the genera of Verbenaceae, Avicenniaceae, Stilbaceae, Chloanthaceae, and Symphoremaceae. Previous genera so treated by me are Acantholippia Griseb., Aegiphila Jacq., Amasonia L. f., Avicennia L., Baillonia Bocq., Bouchea Cham., Casselia Nees & Mart., Castelia Cav., Chascanum E. Mey., Citharexylum B. Juss., Cornutia Plum., Diostea Miers, Dipyrena Hook., Hierobotana Briq., Parodianthus Troncoso, Petitia Jacq., Petrea Houst., Priva Adans., Pseudocarpidium Millsp., Recordia Moldenke, Rehdera Moldenke, Rhaphithamnus Miers, Stylodon Raf., Svensonia Moldenke, Tectona L. f., Verbena [Dorst.] L., Vitex Tourn., and the New World and cultivated members of Callicarpa L.

Full explanation of the abbreviations employed herein for the names of the 276 herbaria whose material, in whole or in part, was examined in the preparation of these works will be found in Phytologia 5: 154--159 (1955), 6: 242 (1958), 7: 91--92 (1959), 7: 123--124 (1960), 7: 343 (1961), 8: 95 (1961), and 9: 191 (1963), with the following additions: Bn = Central College, Bangalore, Mysore, India; Cd = Museo de Córdoba, Córdoba, Argentina; Fj = Fred B. Jones Herbarium, Corpus Christi, Texas; Ij = Science Museum, Institute of Jamaica, Kingston, Jamaica; Lb = University of Missouri, Columbia, Missouri; Sj = University of Puerto Rico, San Juan, Puerto Rico; and Ww = Rob & Bessie Welder Wildlife Federation, Corpus Christi, Texas.

LIPPIA Houst. ex L., Sp. Pl., ed. 1, 633 (1753), Gen. Pl., ed. 5, 282. 1754.

Synonymy: Lippia L. ex A. L. Juss., Gen. Pl., ed. 1, 109. 1789. Lippia Kunth ex Spreng. in L., Syst. Veg., ed. 16, 2: 930. 1825. Dipterocalyx Cham., Linnaea 7: 241. 1832. Zapania Juss. ex Steud., Nom. Bot., ed. 2, 2: 54, in syn. 1841 [not Zapania Lam., 1791, nor Scop., 1806]. Leppia Schau. apud R. A. Phil., Anal. Univ. Chile 90: [Pl. Nuev. Chil.] pl. 1, fig. c--e, sphalm. 1895. Goniostachyum (Schau.) Small, Fl. Southeast. U. S., ed. 1, 1012 & 1337. 1903. Lippia [Houst.] L. ex Robinson & Fern. in A. Gray, New Man. Bot., ed. 7, 189. 1908. Gomostachyum Small ex Cory, Texas Agr. Exp. Sta. Bull. 550: 88, sphalm. 1937. Lippea Hort. ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941. Hippia Bourgeau ex Moldenke, Alph. List Invalid Names Suppl. 1: 10, in syn. 1947. Lippi H.B.K. ex Moldenke, Castanea 13: 116, sphalm. 1948. Lippa L. ex Troncoso, Darwiniana 12: 257, sphalm. 1961.

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Erect bushes, shrubs, undershrubs, or subshrubs, rarely trees, glabrous or variously pubescent with simple hairs, often hirsute or tomentose, sometimes functionally dioecious, in some grassland regions with herbaceous branches issuing from a basal or subterranean woody xylopodium; leaves opposite or ternate, rarely alternate or in 4's, decussate when opposite, simple, deciduous, varying from entire to variously toothed or lobed, exstipulate, petiolate or sessile, flat or rugose above, varying from thin-membranous to heavy-coriaceous, mostly penninerved; inflorescence indeterminate, centripetal, spicate or capitate, solitary or fascicled in the leaf-axils or aggregate in terminal corymbs or panicles, the spikes mostly contracted into heads or cylindric, not usually conspicuously elongating in fruit, very dense-flowered, conspicuously bracteate; bractlets not caducous, decussate or many-ranked, herbaceous, often folded, sometimes concave or flat, imbricate, sometimes forming an involucre, mostly rather large and ovate or lanceolate, often decreasing in size toward the apex of the spike; flowers small, sessile, often dimorphic, borne singly in the axils of the bractlets, often more or less 4-ranked, in some species staminate plants have flowers with well-developed anthers and aborted or non-functional pistil, while pistillate plants have flowers with no stamens or only occasionally 1 or 2 aborted ones; calyx small, membranous, gamosepalous, inferior, ovoid-campanulate or compressed and often 2-carinate or 2-alate, sometimes 2-lipped, its rim 2- or 4-fid or 4-dentate; corolla white or variously colored, hypocrateriform or infundibular, gamopetalous, inferior, zygomorphic, its tube cylindric, straight or incurved, very slender, slightly exserted from the calyx or rarely elongate, equal in di-

ameter throughout or ampliate above, its limb oblique, usually spreading, somewhat 2-lipped, 4-parted, the lobes broad, often retuse at the apex, the posterior one entire, emarginate, or even bifid to about the middle, the lateral ones exterior, the anterior one often larger; stamens 4, didynamous, inserted at about the middle of the corolla-tube, included or slightly exserted, sometimes only 1 or 2 present or completely absent on pistillate plants; anthers ovate, unappendaged, the thecae parallel, often aborted or even absent on pistillate plants; pistil one, often aborted or non-functional on staminate plants; ovary superior, globose, compound, 2-celled, each cell 1-ovulate; style single, often short; stigma single, rather incrassate or capitate, oblique or recurved; ovules basal and erect or affixed laterally near the base; fruit small, dry, ovoid, included by the fruiting-calyx and sometimes adnate to it, dividing into 2 pyrenes or nutlets at maturity, the pericarp papery and hard, the exocarp membranous and rarely distinct from the pyrenes; seeds without endosperm; cotyledons 2.

Riley (1963) gives the sporophytic chromosome number for Lippia as 32 and 36, but he includes the genus Phyla in his concept of Lippia, so it is not clear which of these numbers actually applies to Lippia.

Troncoso (1961) reports that in various species of the Section Euzapania (which she calls Section Lippia) "there exist feminine individuals whose flowers lack stamens, but which nevertheless develop fruits and seeds. These plants evidently receive pollen from other individuals or are apomictic. Individuals with apparently hermaphroditic flowers, on the contrary, never fruit and their flowers fall very quickly. From the large number of specimens with this character it is deduced that these plants are functionally masculine. With the discovery of dioecism in a group of species of Lippia, it was necessary to look for specimens of the other sex and this was done in a number of cases. The two types of flowers were never found in the same inflorescence nor on the same plant. Certain kinds of heteromorphism formerly not understood and attributed to varietal difference or as related species, can now be interpreted as secondary sexual differences."

She says "El género Lippia.....siempre ha sido considerado de flores hermafroditas. En realidad la mayoría de las especies lo son, pero en el Subgénero Lippia, Secc. Lippia.....he descubierto un grupo francamente dioico, aunque a primera vista no lo aparenta. Las flores funcionalmente masculinas conservan un gineceo abortivo, pero en cambio las flores femeninas carecen totalmente de estambres y estaminodios, sólo muy excepcionalmente he observado 1 ó 2 estambres abortados. Esta caso de aparente ginodioecia y real dioecia en Lippia es la inversa de lo hallado en el género andino de Malváceas Nototriche, donde Krapovickas (1957) habla de 'androdioecia morfológica' pero 'dioecia funcional'." She further describes the two types of plants, as observed by her, as follows: "I. Plantas femeninas.....Capítulos más pequeños. Flores por lo general sin rastros de estambres o estam-

inodios, muy rara vez 1 ó 2 estambres abortados. Corola más reducida. Tubo corolar angosto, cilíndrico. Cáliz bien desarrollado, conspícuo, acrescente en el fruto. Corola persistente, aún en el fruto en desarrollo. Gineceo normal; estilo largo, casi hasta la garganta del tubo corolar. Fructificación normal. II. Plantas masculinas.....Capítulos mauores. Flores con 4 estambres didínamos, muy rara vez con 1 ó 2 estambres abortados, Corola mayor. Tubo corolar infundibuliforme, ensanchado en el lugar de inserción de las anteras. Cáliz ausente o si presente, inconspicuo, reducido a dos pequeñas escamitas membranosas. Flores pronto caducas. Gineceo presente, aparentemente normal aunque algo menor; estilo poco más breve, generalmente por debajo de la inserción de los estambres inferiores. Fructificación nula."

It should be noted here that the entire discussion by Junell (1934) of the gynoecium morphology of Lippia is based on species which are now excluded from the genus (Aloysia, Diostea, and Phyla) and is therefore valueless here. The genus is mentioned by Rosengurtt Gurvich (1941) as one of the genera in Uruguay with most numerous "hierbas hemicriptofitas leñosas".

Lippia is a genus of about 252 species, varieties, and named forms, widely distributed in subtropical and tropical America, a few also in tropical portions of the Old World. The genera Acantholippia Griseb. (5 species), Aloysia Ortega (51 species and varieties), Burroughsia Moldenke (2 species), Nashia Millsp. (7 species), Phyla Lour. (20 species, varieties, and forms), and a portion of Diostea Miers (3 species) are often included in Lippia, but are kept separate by me. Cryptocalyx Benth., Zapania Lam., and Zapania Scop., as well as Zappania Scop. and Zappania Zuccagni, are also sometimes included in the synonymy of Lippia, but belong more properly in that of Phyla Lour. and Priva Adans.

The genus is named in honor of and is dedicated to Auguste Lippi (1678--1704), an Italian explorer and naturalist in Abyssinia, where he was murdered at the age of 26 by natives. Soukup (1963) refers to him as a French physician and botanist and gives his first name as "Augustín", while Acuña (1945) also speaks of him as "médico y botánico francés" and spells his given name "Augusto". Alvarez (1919) writes the generic name with a lowercase initial letter in many instances!

The type of the genus is Lippia americana L., based on specimen no. 1 under genus 801 in the Linnean Herbarium at London.

It is of interest to note that Bentham (1876) regarded the genus, in its broad sense, as containing 90 species, Baker (1877) eighty, but later (1900) says "about 60", and Pearson (1901) says "about 110".

The genus was placed by Westmann (1744) in his group Alatae, by Linnaeus (1753, 1754) in his Didynamia Angiosperma and later in his Stellata, by Adanson (1763) in his Verbeneae, and by Rüling (1774) in his Lonicerae. In 1789 A. L. Jussieu classified it in what he called the Vitices, section II "Flores spicati, in spicis

alterni", along with Petrea Houst., Citharexylum B. Juss., Duranta L., Lantana L., Taligalea Aubl. [now known as Amasonia L. f.], Tamonea Aubl. [=Ghinia Schreb.], Verbena [Dorst.] L., and the non-verbenaceous genera Spielmannia Medic. [=Oftia Adans., in the Myoporaceae] and Perama Aubl. [in the Rubiaceae]. In 1806 the same authority placed Lippia in "les Verbénacées".

In 1790 it was placed by Necker in his Plasyrgophytum ["Plasyrgophyta" according to Steudel, 1841], along with Amasonia, Citharexylum, Duranta, Lantana, Petrea, Clerodendrum Burm., Diphystema Neck. [=Amasonia], Ovieda L. [=Clerodendrum], Premna L., and Volkameria L. [=Clerodendrum], as well as the non-verbenaceous Spielmannia [=Oftia, Myoporaceae], Selago L. [in the Selaginaceae], and 35 other genera, of which 12 are now placed in the Scrophulariaceae, 5 in the Acanthaceae, 3 each in the Pedaliaceae, Solanaceae, and Bignoniaceae, 2 each in the Gentianaceae and Gesneriaceae, and 1 each in the Caprifoliaceae, Martyniaceae, Loganiaceae, Orobanchaceae, and Polemoniaceae.

In 1805 J. H. Jaume Saint-Hilaire first proposed the name which we now employ for the family, Verbenaceae, and placed Lippia in his Section 2 "Fleurs disposées en épis alternes" along with Citharexylum, Duranta, Lantana, Petrea, Taligalea, Tamonea, Verbena, Zapania Juss., and the non-verbenaceous Perama and Spielmannia. Sprengel (1825) placed Lippia in the Section Verbeneae and Endlicher (1838) in the Tribe Lippieae of this family. Reichenbach, however, classified (1827, 1828, 1833) Lippia in his Section Verbeneae of the family Labiatae!

Schauer (1847, 1851) divides the genus Lippia into 5 sections and 3 subsections, as follows:

Section 1. Aloysia. Racemi vel spicae laxae. Calyx inaequaliter 4-fidus.

Section 2. Goniolippia. Capitula densa tetraquetra, pedunculata, gemina--plurima axillaria.

Section 3. Dipterocalyx. Capitula densa plurifariam imbricata, saepius squarrosa. Calyx compressus, bicarinatus vel bialatus, longe ciliatus, breviter bifidus.

Section 4. Zapania. Capitula densa plurifariam imbricata. Bracteae neque magnae neque post anthesin auctae. Calyx brevitubulosus membranaceus.

Subsection 1. Axilliflorae. Capitula axillaria.

Subsection 2. Paniculatae. Capitula densa terminali-paniculata.

Subsection 3. Corymbosae. Capitula adulta subspicata vel subracemosa, laxa, corymboso-paniculata.

Section 5. Rhodolippia. Capitula magna, subglobosa, aequaliter imbricata. Bracteae membranaceae, latae, petaloideae, purpurascentes, post anthesin demum conspicue auctis.

Bentham (1876) says "Genus a Schauero in sectiones 5 imprimis ad inflorescentiam dividitur, dein ad variationes calycis et fructus pyrenas facile v. difficile solvendas, qui tamen characteres valde incerti. Inflorescentia sola series 2 praebet facile distinguendas, etsi characteres florales fere eidem." He divides Lippia into just 2 sections: Aloysia, with "spicis elongatis gracilibus laxis, bracteis parvis angustis, calycibus in plerisque dense hirsutis", and Zapania, with "spicis densis cylindraceis v. globosis, bracteis latis obtusis v. brevissime cuspidatis rarius acutiusculis nunc herbaceis imbricatis, nunc coloratis laxioribus exterioribus amplis". Of Acantholippia Griseb. he says "Acantholippia.....ab auctore a Lippia distinguitur seminibus albuminosis. A. salsoloidem Griseb., e Catamarca, non vidimus, sed planta habitum, folia alterna minima 3—5-fida aliasque notas plurimas cum descriptione conveniens lecta a Pearceo ad Jeyring in prov. Salta, semina tamen in specimine nostro nondum perfecte matura. Albumen parvum verisimiliter adest in speciebus pluribus Lippiae, et Acantholippia facile pro sectione Lippiae habenda, calycibus dense hirsutis floribusque Aloysiae, sed habitu fruticuloso saepe spinescente, foliis parvis oppositis v. alternis saepius lobatis et marginibus valde recurvis subtus quasi canaliculatis, spicis saepius brevibus densis. Species adsunt 3 v. 4, omnes ex America australi extratropica." Of Riedelia Cham. he says "Riedelia.....a Schauero inter Lippias (Zapanias) admissa, fructu nigro nitidissimo sponte non secedente, inter Lippiam et Lantanam fere medium tenet, his habitu bracteisque acuminatis similior. Genera duo caeterum limitibus certis vix distincta."

Briquet (1894) divides the genus Lippia into 10 groups, characterized as follows:

Subgenus 1. Aloysia (Ort.) Schau. Verlängerte Trauben oder Ähren, terminal, axillär oder in Rispen gruppiert. Blumen oft in Scheinquirle zusammengezogen. Bracteen klein, oft abfallig. Kelch fast gleich 4-spaltig. Ausschliesslich südamerikanische Arten.

Subgenus 2. Zapania (Scop.) Benth. Kurtze, gewöhnlich zu Köpfchen gedrängte Ähren mit breiten, nicht abfälligen Bracteen.

Section 1. Goniostachyum Schau. [not "Gonostachyum" as written by Briquet (1894) and by Augusto (1946)]. Köpfchen etwas ährig, sich wenig verlängernd, mit decussierten, gefalteten, dachziegelig sich deckenden Bracteen, axillär, gestielt. Blumen sehr klein. Kelch unbeflügelt. Zahlreiche südamerikanische, besonders brasilianische Sträucher.

Section 2. Acantholippia (Griseb.) Briq. Köpfchen etwas ährig, sich wenig verlängernd, mit dachziegelig sich deckenden Bracteen. Kelch unbeflügelt. Kleine, dornige Sträucher mit kleinen, rückwärts gebogenen Blätter.

Section 3. Dipterocalyx (Cham.) Schau. Köpfchen klein, mit mehreren Reihen dachziegelig sich deckenden Bracteen, axillär, oft mit den reduzierten Blätter eine art Rispe bildend. Kelch zusammengedrückt, beiderseits mit einem schmalen, be-

haarten Flügel versehen, kurz 2-teilig. Frucht im Kelch eingeschlossen. Tropisch-amerikanische Sträucher.

Section 4. Euzapania Briq. Köpfchen mit mehreren Reihen dachziegelig sich deckenden Bracteen, während der Blütezeit sich ± verlängernd. Bracteen concav oder flach, den Kelch deckend. Kelch kurz röhrig, hin und wieder zusammengedrückt, aber nicht flügelig.

Subsection 1. Axilliflorae (Schau.) Briq. [not "Axillifolorae" as written by Augusto (1946)]. Köpfchen axillär, ± gestielt. Zahlreiche tropisch-amerikanische Arten von sehr verschiedenem Aussehen.

Subsection 2. Paniculatae (Schau.) Briq. Köpfchen halbkugelig, mit sehr gedrängten Blumen, gestielt, einen ± rispigen oder cymös-rispigen, terminalen Blütenstand bildend. 8--9 brasilianische Arten.

Subsection 3. Corymbosae (Schau.) Briq. Ausgebildete Köpfchen ährenförmig verlängert, in rispigen Dolden gruppiert. 6--7 brasilianische Arten.

Section 5. Rhodolippia (Schau.) Briq. Köpfchen zu Anfang der Blütezeit halbkugelig, mit gleichen, dachziegelig sich deckenden Bracteen, mit einen Involucrum versehen. Bracteen des Involucrums breit, membranartig, blass, lila oder rosafarbig, nach der Blütezeit stark wachsend, endlich sehr gross, netzaderig.

Subsection 4. Köpfchenstiele zu mehreren in den Blattachseln. Mexikanische Arten.

Subsection 5. Köpfchenstiele einseln oder zu 2 in den Blattachseln. Südamerikanische Sträucher mit prächtig lila- oder rosafarbig ausgebildeten Bracteen des Involucrum.

Of these groups, his Subgenus 1, Aloysia, is now regarded as a separate genus, Aloysia Ortega; his Section 2, Acantholippia, is now, in greater part, the separate genus Acantholippia Griseb.; and his Subsection 1, Axilliflorae, is now, in its herbaceous or subherbaceous part, the separate genus Phyla Lour. With the removal of the species belonging to these segregated genera, there remain the following of the "classic" species in his groups:

Section 1. Goniostachyum — L. affinis Schau., L. berlandieri Schau. [=L. graveolens], L. glandulosa Schau., L. gracilis Schau., L. grata Schau., L. graveolens H.B.K., L. macrophylla Cham. [=Lantana macrophylla (Cham.) Schau.], L. martiana Schau., L. nepetacea Schau., L. origanoides H.B.K., L. pohliana Schau., L. rigida Schau., L. rubiginosa Schau., L. salviaefolia Cham., L. schomburgkiana Schau., L. sericea Cham., L. sidoides Cham., L. stachyoides Cham., L. velutina Schau.

Section 2. Spinulosae Moldenke, nom. nov. Foliis spinulis armatis. — L. salsa Griseb.

Section 3. Dipterocalyx — L. adoënsis Hochst. [=L. abyssinica (Otto & Dietr.) Cuf.], L. americana L., L. hemisphaerica Jacq. [=L. americana], L. hirsuta L. f., L. hirta (Cham.) Schau.,

L. myriocephala Schlecht. & Cham.

Section 4. Euzapania

Subsection 1. Axilliflorae — L. alnifolia Schau., L. argyrophylla Schau. [=Lantana aristata (Schau.) Briq.], L. aristata Schau. [=Lantana aristata (Schau.) Briq.], L. asperrima Cham., L. asperifolia L. C. Rich. [=L. javanica (Burm. f.) Spreng.], L. bicolor Mart. & Schau. [=L. bellatula Moldenke], L. ferruginea H.B.K., L. filifolia Mart. & Schau., L. geminata H.B.K. [=L. alba (Mill.) N. E. Br.], L. hermannioides Cham. [=L. microcephala], L. iodophylla Schau., L. linearis H.B.K., L. microcephala Cham., L. micromera Schau., L. nana Schau., L. pseudo-thea (A. St.-Hil.) Schau., L. pumila Cham., L. riedeliana Schau., L. satureiaefolia Mart. & Schau., L. thymoides Mart. & Schau., L. turnerifolia Cham.

Subsection 2. Paniculatae — L. angustifolia Cham., L. herbacea Mart., L. hieracifolia Cham., L. intermedia Cham., L. oxycnemis Schau., L. vernonioides Cham.

Subsection 3. Corymbosae — L. acutidens Mart. & Schau., L. corymbosa Cham., L. grandiflora Mart., L. lacunosa Mart. & Schau., L. lasiocalycina Cham., L. rotundifolia Cham., L. schaueriana Mart.

Section 5. Rhodolippia

Subsection 4. Mexicanae Moldenke, nom. nov. Pedunculis in axillis foliorum numerosis — L. callicarpaefolia H.B.K., L. umbellata Cav.

Subsection 5. Brasilianae Moldenke, nom. nov. Pedunculis in axillis foliorum solitariis vel binis — L. elliptica Schau., L. eupatorium Schau., L. florida Cham., L. gardneriana Schau., L. hederaefolia Mart. & Schau., L. lupulina Cham., L. rhodocnemis Mart. & Schau.

Troncoso (1961) adds to Section Goniostachyum, L. obscura Briq.; to Section Dipterocalyx, L. hassleriana Chod., L. sclerophylla Briq.; to Section Euzapania [which she calls Sect. Lippia], Subsection Axilliflorae [which she calls "Series"], L. aberrans (Briq.) Troncoso [=L. tristis var. aberrans Briq.], L. balansae Briq., L. contermina Briq., L. coriacea Briq., L. longepedunculata Kuntze, L. modesta Briq., L. phaeocephala Briq., L. polytricha Briq., L. tegulifera Briq., L. trachyphylla Briq., L. tristis Briq.; to Subsection Paniculatae [which she calls "Series"], L. scaposa Briq. She adds a new Section 6. Pseudaloysia Troncoso. Frutices, spicis brevibus laxis, pedunculatis, axillaribus, insertione saepe a petiolo distanti (supra-axillari), bracteis lanceolatis, pro rata magnis, coloratis, floribus breviter pedicellatis, calyce hirto, bilabiato-bifido, 4-dentato. — L. phryxocalyx Briq.

It should be mentioned here that some of the references given in

the bibliography of this genus on previous pages are cited differently (and sometimes incorrectly) in other works on the genus. Among these may be mentioned the following: J. G. Baker, Journ. Linn. Soc. Lond. Bot. 20: 225. 1883 [often cited as "1884"]; Blume, Bijdr. 14: 821--822. 1826 [often cited as "Blume, Bijdr. 811"]; Cham., Linnaea 7: 275 [this is apparently an error or some sort since there is no mention of Lippia on that page]; Coult., Contrib. U. S. Nat. Herb. 2: 328--329. 1892 [often cited as "1891" or as "1894"]; Delchev., Rev. Hortic. 44: 316--317. 1872 [often cited to "Carr." as author, but the article is definitely signed by Delchevalerie, not Carrière]; Desv., Journ. Bot. 4: 177 [apparently an error of some sort, since there is no mention of Lippia on that page]; Emory, Rep. U. S. & Mex. Bound. Surv. 2: 126--127. 1858 [often cited as "Torr., Bot. Mex. Bound. 127, 1859"]; Hook., Bot. Misc. 1: 171--173. 1829 [sometimes cited as "Bot. Misc. 1: 162. 1830"]; F. Krauss, Flora 28: 68. 1845 [often cited as "Hochst., Flora"]; Lam., Tabl. Encycl. Méth. Bot. 3: pl. 539 [sometimes cited as "Lam., Illustr. 1: 90, pl. 529"]; L'Hér., Stirp. Nov. 1: 21--24, pl. 12. 1786 [sometimes cited as "1784"]; Marthe, Cat. Pl. Jard. Méd. Paris 67 [often cited as "Rich., Cat. Hort. Med. Paris"]; Mart., Fl. Bras. 9: 219--252 & 307, pl. 36--41. 1851 [sometimes cited as "Mart., Fl. Bras. 10: 219"]; Moldenke, Holmbergia 4: 149--150. 1945 [sometimes erroneously cited as "1944"]; Moldenke, Phytologia 2: 65--125. 1945 [often erroneously cited as "1944"]; Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 196--197. 1892 [sometimes cited as "Morong, N. Y. Acad. 7: 196. 1893"]; R. A. Phil., Anal. Univ. Chile 90: 618--624. 1895 [often cited as "1896"] and 91: 415--416. 1896 [often cited as "1895"]; Pluk., Almag. Bot. 382, pl. 232, fig. 4. 1696 [sometimes cited as "2: 382"]; Reichenb., Icon. Bot. Exot. pl. 169. 1830 [sometimes cited as "Reichenb., Hort. Bot. 1828"]; Sagra, Hist. Fis. Cuba 11: 140. 1850 [often cited as "Sagra, Fl. Cub."]; Thiselt.-Dyer, Fl. Cap. 5 (1): 189--197. 1901 [sometimes cited as "1910" or "1912"]; Walp., Nov. Act. Acad. Caes. Leopold.-Carol. Nat. Cur. 19: suppl. 1: 377. 1843 [sometimes cited as "17, 1: 377"]; J. K. Small, Fl. Southeast. U. S., ed. 1, 1012 (1903) and ed. 2, 1012. 1913 [sometimes cited as "1014"].

Zohary (1962) describes an ecologic association in Palestine called the Lippieto-Trifolietum fragiferi association, but it is Phyla nodiflora (L.) Greene to which he refers here.

Quite a few vernacular or common names have been recorded by authors in the past for the genus as a whole. Mostly, however, they refer only to species native or cultivated in the area with which the particular writer is acquainted; sometimes they refer to an unidentified plant thought by the writer to be a member of this genus; often they refer to species now placed in segregated genera. Necker (1790) records "lippée"; Gerth van Wijk (1911, 1916) records "lippi", "lippia", "lippie", and "Zitronenlippe"; Reko (1945) lists "guia huace", "orégano montés", and "quie huace"; Westcott (1950) lists "fog-fruit" and "lemon-verbena"; Lombardo (1954) records "salvia trepadora"; and Soukup (1962, 1963, 1964)

lists "aimara", "cedroncillo", "cedro pashaco", "chichara caspi", "cidra", "huari pancara", "micho caspi", "micho-caspi", "orégano", "pampa orégano", and "sideraea". Eyles and others record "zezuru", "zimbani", and "zumbani" from Rhodesia. Actually, the name fog-fruit applies only to the genus Phyla Lour., not to Lippia, while "Zitronenlippe" applies to Aloysia triphylla (L'Hér.) Britton. The name "cariaquito negro" recorded for Lippia by Ll. Williams on his collection no. 12877 actually belongs to Varronia globosa Jacq., while the "escoba negra" recorded by Hjalmarson belongs to Cordia cana Mart. & Gal., both members of the Ehretiaceae.

Razi (1950) avers that dissemination of members of the genus Lippia is endozoic. Seymour (1929) lists Meliola cookeana Speg. and M. lippiae Maubel. as infesting an unidentified species of Lippia. Houard (1933) calls attention to the fact that Lippia species are infested with insect galls in Argentina (he probably refers here to L. turbinata Griseb.). Westcott (1950) records the following animal and fungal pests of Lippia: Spot Anthracnose (Sphaceloma lippiae) in Indiana; Black Mildew (Meliola lippiae) in Florida [both of these probably are pests of Phyla, not Lippia]; Southern Blight (Sclerotium rolfsii) in California [this is on Aloysia triphylla, not Lippia!]; Leaf Spot (Cercospora lippiae, widespread; Cylindrosporium lippiae in Texas); Root Knot Nematode (Heterodera marioni); and Root Rot (Phymatotrichum omnivorum) in Texas.

Members of the genus are said to be used as a tea and as a scent in Rhodesia, also to drive away fleas and to use as a corpse deodorizer. Calpouzos (1954) comments on the fragrant tea herb, oregano: "Oregano is becoming a popular herb in America. The botanical identity of the plants sold as oregano in the United States has been in doubt. Most of the plants belong in the genus Lippia, of the family Verbenaceae, and come from Mexico. The rest of our supply of this herb comes from Europe. These latter plants belong to the genus Origanum of the family Labiatae. Species in other genera are also called 'oregano', or some variation of this name [for a complete list of which, see under L. affinis in these notes], in many parts of the world. The term 'oregano' should not be used to refer only to a single plant species but rather to a number of species, all having in common a particular herb flavor."

Le Cointe (1934, 1947) speaks of a Lippia commonly cultivated in São Paulo, Brazil -- this is probably L. alba (Mill.) N. E. Br. The "Lippia sp." of Stellfeld (1951) is actually two very distinct species -- the Dusén 14929 to which he refers is L. obscura Briq., while the Jönsson 35a is L. turnerifolia Cham. An unidentified species is also listed by Miranda (1953, page 363) from Chiapas, Mexico, another by Alain (1946) from Cuba, and another by Seckt (1930) from Córdoba, Argentina. I have not as yet seen the specimens (as far as I am aware, at least) referred to by these authors.

Material has been identified by various botanical workers as Lippia in the past which actually belongs in such other verbenaceous genera as Acantholippia, Aloysia, Burroughsia, Citharexylum, Diostea, Junellia, Lantana, Nashia, Neosparton, Phyla, Stachytarpheta, and Verbena, and even in such non-verbenaceous genera as Acrocephalus (Lamiaceae), Avicennia (Avicenniaceae), Buddleia (Loganiaceae), Machaonia (Rubiaceae), Microdon (Selaginaceae), Rhaphiodon (Lamiaceae), and Valeriana (Valerianaceae).

The Baron 953, Hildebrandt 4040, and United States National Herbarium 808297, distributed as Lippia, are actually Acrocephalus villosus Benth. (Lamiaceae), of which the first-mentioned is the type collection; Galeotti 795b is Batis maritima L. (Batidaceae); M. E. Jones 370 is Borreria podocephala Benth. (Rubiaceae); M. E. Jones 366 is Buddleia marrubiifolia Benth. (Loganiaceae); Bernardi s.n. and Linden 1214 are Cordia sp. (Ehretiaceae); Hjalmarson s.n. [Honduras] is Cordia cana Mart. & Gal.; Munz 1585 is Eryngium prostratum Nutt. (Ammiaceae); Glaziou 21901 is Hyptis longipes St.-Hil. (Lamiaceae), Hassler 11062 is Hyptis sp. aff. H. lutescens Pohl, Hjalmarson s.n. [Honduras] is H. urticoides Kunth, and Pittier 14945 is Hyptis sp.; Jörgensen 2479 is Lantana glutinosa Poepp.; Swartz s.n. [Jamaica] is the type collection of Machaonia cymosa (Sw.) Griseb. (Rubiaceae); M. E. Jones 363 & 364 are Varronia cana Mart. & Gal. (Ehretiaceae); and Ll. Williams 12877 is Varronia globosa Jacq.

A list of species and of names proposed in this genus, but now excluded therefrom, follows:

Goniostachyum citrosum Small = Lantana microcephala A. Rich.
Lippea hirsuta var. purpurea Hort. = Lantana scabiosaeflora H.B.K.
Lippea juncea Gay = Diostea juncea (Gill. & Hook.) Miers
Lippea lycioides (Cham.) Steud. = Aloysia gratissima (Gill. & Hook.) Troncoso
Lippia achyranthifolia Desf. = Lantana achyranthifolia Desf.
Lippia aculeata L. = Phyla betulaefolia (H.B.K.) Greene
Lippia aegyptiaca Carr. = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia aegyptiaca Delchev. = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia affinis Briq. = Aloysia sellowii (Briq.) Moldenke
Lippia aloysioides Loes. = Aloysia aloysioides Loes. & Moldenke
Lippia aphylla R. A. Phil. = Diostea scoparia (Gill. & Hook.) Miers
Lippia appendiculata Robinson & Greenm. = Burroughsia appendiculata (Robinson & Greenm.) Moldenke
Lippia arguta Mart. = Lantana aristata (Schau.) Briq.
Lippia argyrophylla Schau. = Lantana aristata (Schau.) Briq.

Lippia aristata Schau. = Lantana aristata (Schau.) Briq.
Lippia aristata f. pluripedunculata Kuntze = Lantana aristata var. angustifolia (Kuntze) Moldenke
Lippia aristata var. angustifolia Kuntze = Lantana aristata var. angustifolia (Kuntze) Moldenke
Lippia aristata var. pluripedunculata Kuntze = Lantana aristata var. angustifolia (Kuntze) Moldenke
Lippia armata Urb. = Nashia armata (Urb.) Moldenke
Lippia aspenfolia Mettam = Lantana scabrifolia Moldenke
Lippia asperifolia Benth. = Phyla scaberrima (A. L. Juss.) Moldenke
Lippia asperifolia Reichenb. = Phyla scaberrima (A. L. Juss.) Moldenke
Lippia barbata T. S. Brandeg. = Aloysia barbata (T. S. Brandeg.) Moldenke
Lippia betulaefolia Humb. & Bonpl. = Phyla betulaefolia (H.B.K.) Greene
Lippia betulaefolia Humb. & Kunth = Phyla betulaefolia (H.B.K.) Greene
Lippia betulaefolia H.B.K. = Phyla betulaefolia (H.B.K.) Greene
Lippia betulaefolia Kunth = Phyla betulaefolia (H.B.K.) Greene
Lippia betulifolia H.B.K. = Phyla betulaefolia (H.B.K.) Greene
Lippia betulifolia Kunth = Phyla betulaefolia (H.B.K.) Greene
Lippia caespitosa Rusby = Phyla caespitosa (Rusby) Moldenke
Lippia canescens Humb. = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia canescens Humb. & Bonpl. = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia canescens Humb. & Kunth = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia canescens H.B.K. = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia canescens Kunth = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia canescens Rich. = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia canescens Robinson = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia capitulis ovatis, foliis linearibus integerrimis L. = Microdon ovatus (L.) Choisy, Selaginaceae
Lippia cayensis Urb. = Nashia cayensis Britton
Lippia chamaedrifolia Steud. = Aloysia chamaedryfolia Cham.
Lippia chamaedrifotia Steud. = Aloysia chamaedryfolia Cham.
Lippia chamaedrioides Steud. = Aloysia chamaedryfolia Cham.
Lippia chamaedryfolia L. = Aloysia chamaedryfolia Cham.
Lippia chamaedryoides Steud. = Aloysia chamaedryfolia Cham.
Lippia chamissonis Benth. & Hook. = Lantana chamissonis (D. Dietr.)

Benth.
Lippia chamissonis D. Dietr. = Lantana chamissonis (D. Dietr.) Benth.
Lippia chamissonis Schau. = Lantana chamissonis (D. Dietr.) Benth.
Lippia chamssonis D. Dietr. = Lantana chamissonis (D. Dietr.) Benth.
Lippia chilensis Schau. = Aloysia salviaefolia (Hook. & Arn.) Moldenke
Lippia cilindrica Scheele = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Lippia citrata Schlecht. = Aloysia triphylla (L'Hér.) Britton
Lippia citriodora Humb. & Kunth = Aloysia triphylla (L'Hér.) Britton
Lippia citriodora H.B.K. = Aloysia triphylla (L'Hér.) Britton
Lippia citriodora Kunth = Aloysia triphylla (L'Hér.) Britton
Lippia citriodora (Lam.) H.B.K. = Aloysia triphylla (L'Hér.) Britton
Lippia citriodora (Lam.) Kunth = Aloysia triphylla (L'Hér.) Britton
Lippia citrodora H.B.K. = Aloysia triphylla (L'Hér.) Britton
Lippia citrodora Kunth = Aloysia triphylla (L'Hér.) Britton
Lippia citroidora H.B.K. = Aloysia triphylla (L'Hér.) Britton
Lippia cujabensis Mart. = Lantana brasiliensis Link
Lippia cuneafolia (Torr.) Steud. = Phyla cuneifolia (Torr.) Greene
Lippia cunefolia Torr. = Phyla cuneifolia (Torr.) Greene
Lippia cuneifolia Steud. = Phyla cuneifolia (Torr.) Greene
Lippia cuneifolia Torr. = Phyla cuneifolia (Torr.) Greene
Lippia cuneifolia (Torr.) Greene = Phyla cuneifolia (Torr.) Greene
Lippia cuneifolia (Torr.) Steud. = Phyla cuneifolia (Torr.) Greene
Lippia cuneifolia Torr. & Steud. = Phyla cuneifolia (Torr.) Greene
Lippia cuneifolia Zipp. = Phyla nodiflora (L.) Greene
Lippia cuneifolia var. angustissima Gr. = Phyla cuneifolia (Torr.) Greene
Lippia cuneifolia var. incisa (Small) Blankinship = Phyla incisa Small
Lippia cuneifolia var. incisa (Small) Lindheimer = Phyla incisa Small
Lippia cylindrica Scheele = Stachytarpheta cayennensis (L. C. Rich.) Vahl
Lippia cymosa Sw. = Machaonia cymosa (Sw.) Griseb., Rubiaceae
Lippia darwinii Speg. = Neosparton darwinii Benth.
Lippia densispicata Kunth & Bouché, Ind. Sem. Hort. Berol. 12. 1847 = Aloysia densispicata (Kunth & Bouché) Moldenke, comb.

nov.
Lippia deserticola F. Phil. = Acantholippia deserticola (F. Phil.) Moldenke
Lippia deserticola R. A. Phil. = Acantholippia deserticola (F. Phil.) Moldenke
Lippia dinteri Moldenke = Lantana dinteri Moldenke
Lippia dulcis Sessé & Moc. = Phyla scaberrima (A. L. Juss.) Moldenke
Lippia dulcis Trev. = Phyla scaberrima (A. L. Juss.) Moldenke
Lippia dulcis var. mexicana Wehmer = Phyla scaberrima (A. L. Juss.) Moldenke
Lippia echinus Spreng. = Rhaphiodon echinus (Spreng.) Schau., Lamiaceae
Lippia fastigiata T. S. Brandeg. = Burroughsia fastigiata (T. S. Brandeg.) Moldenke
Lippia fiebrigii Hayek = Aloysia fiebrigii (Hayek) Moldenke
Lippia filiformis Schau. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia filiformis Schrad. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia fimbriata Rusby = Lantana achyranthifolia Desf.
Lippia floribunda Hort. = Lantana achyranthifolia Desf.
Lippia floribunda R. A. Phil. = Aloysia reichii Moldenke
Lippia foliolosa R. A. Phil. = Acantholippia seriphioides (A. Gray) Moldenke
Lippia foliosa Phil. = Acantholippia seriphioides (A. Gray) Moldenke
Lippia foncki R. A. Phil. = Aloysia foncki (R. A. Phil.) Moldenke
Lippia geminata Millsp. = Lantana microcephala A. Rich.
Lippia geminata var. lockhartii Griseb. = Lantana lockhartii (Griseb.) G. Don
Lippia geminata β lockhartii Griseb. = Lantana lockhartii (Griseb.) G. Don
Lippia glauca Rose = Avicennia germinans (L.) L.
Lippia gracilis R. A. Phil. = Acantholippia trifida (C. Gay) Moldenke
Lippia grandiceps Taylor = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia grisebachii Hieron. = Aloysia gratissima (Gill. & Hook.) Troncoso
Lippia grisebachii Lorentz & Hieron. = Aloysia sellowii (Briq.) Moldenke
Lippia hastatula (Griseb.) Hieron. = Acantholippia hastulata Griseb.
Lippia hastatula Hieron. = Acantholippia hastulata Griseb.
Lippia hastulata Griseb. = Acantholippia hastulata Griseb.
Lippia hastulata (Griseb.) Hieron. = Acantholippia hastulata Griseb.
Lippia hispida Gay = Acantholippia trifida (C. Gay) Moldenke
Lippia ilan ilan Bailes = Aloysia looseri Moldenke

Lippia ilan ilan Baines = Aloysia looseri Moldenke
Lippia imbricata Kuntze = Lantana achyranthifolia Desf.
Lippia inaguensis (Millsp.) Urb. = Nashia inaguensis Millsp.
Lippia incisa E. D. Schulz = Phyla incisa Small
Lippia incisa Small = Phyla incisa Small
Lippia incisa (Small) Tidestr. = Phyla incisa Small
Lippia incisa Tidestr. = Phyla incisa Small
Lippia involucrata Cooper = Lantana involucrata L.
Lippia iresinoides Griseb. = Buddleia iresinoides (Griseb.) Hoss., Loganiaceae
Lippia japonica Hort. = Citharexylum ligustrinum Van Houtte
Lippia juncea Gay = Diostea juncea (Gill. & Hook.) Miers
Lippia juncea Gill. & Hook. = Diostea juncea (Gill. & Hook.) Miers
Lippia juncea (Gill. & Hook.) Schau. = Diostea juncea (Gill. & Hook.) Miers
Lippia juncea (Miers) Gill. & Hook. = Diostea juncea (Gill. & Hook.) Miers
Lippia juncea Schau. = Diostea juncea (Gill. & Hook.) Miers
Lippia juncea var. α Gill. = Diostea juncea (Gill. & Hook.) Miers
Lippia kisi A. Rich. = Lantana kisi A. Rich.
Lippia lagustrina Britton = Aloysia gratissima (Gill. & Hook.) Troncoso
Lippia lanceolata Michx. = Phyla lanceolata (Michx.) Greene
Lippia lanceolata (Michx.) Greene = Phyla lanceolata (Michx.) Greene
Lippia lanceolata (Pursh) Michx. = Phyla lanceolata (Michx.) Greene
Lippia lanceolata Rich. = Phyla lanceolata (Michx.) Greene
Lippia lanceolata Rose = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia lanceolata var. recognita Fern. & Grisc. = Phyla lanceolata (Michx.) Greene
Lippia leptophylla Loes. = Aloysia leptophylla Loes. & Moldenke
Lippia ligustrifolia G. Thuret = Citharexylum ligustrinum Van Houtte
Lippia ligustrina Auct. Amer. = Aloysia gratissima (Gill. & Hook.) Troncoso
Lippia ligustrina Britton = Aloysia gratissima (Gill. & Hook.) Troncoso
Lippia ligustrina Kuntze = Aloysia gratissima (Gill. & Hook.) Troncoso
Lippia ligustrina Lag. = Junellia ligustrina (Lag.) Moldenke
Lippia ligustrina (Lag.) Britton = Junellia ligustrina (Lag.) Moldenke

Lippia ligustrina (Lag.) Kuntze = Junellia ligustrina (Lag.) Moldenke

Lippia ligustrina Nutt. = Aloysia gratissima (Gill. & Hook.) Troncoso

Lippia ligustrina G. Thuret = Citharexylum ligustrinum Van Houtte

Lippia ligustrina var. casadensis Hassler = Aloysia casadensis Hassler & Moldenke

Lippia ligustrina var. lasiodonta Briq. = Aloysia gratissima var. paraguariensis (Briq.) Moldenke

Lippia ligustrina var. paraguariensis Briq. = Aloysia gratissima var. paraguariensis (Briq.) Moldenke

Lippia ligustrina var. schulzii Standl. = Aloysia gratissima var. schulzae (Standl.) Moldenke

Lippia ligustrinia O. K. = Aloysia gratissima (Gill. & Hook.) Troncoso

Lippia liliformes Schrad. = Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia lippioides (Cham.) D. Dietr. = Lantana chamissonis (D. Dietr.) Benth.

Lippia lippioides (Cham.) Rusby = Lantana chamissonis (D. Dietr.) Benth.

Lippia lippioides Rusby = Lantana chamissonis (D. Dietr.) Benth.

Lippia lithosperma Mart. = Lantana brasiliensis Link

Lippia litoralis Kunth = Verbena litoralis H.B.K.

Lippia litoralis R. A. Phil. = Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia litorlis Kunth = Verbena litoralis H.B.K.

Lippia littoralis Phil. = Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia lobata T. S. Bradeg. = Aloysia barbata (T. S. Bradeg.) Moldenke

Lippia lockhartii Grosourdy = Lantana lockhartii (Griseb.) G. Don

Lippia longifolia Sessé & Moc. = Phyla stoechadifolia (L.) Small

Lippia looseri (Moldenke) Looser = Aloysia looseri Moldenke

Lippia lycioides Steud. = Aloysia gratissima (Gill. & Hook.) Troncoso

Lippia lycoides Steud. = Aloysia gratissima (Gill. & Hook.) Troncoso

Lippia macrastachya (Torr.) Wats. = Aloysia macrostachya (Torr.) Moldenke

Lippia macrastachys (Torr.) Wats. = Aloysia macrostachya (Torr.) Moldenke

Lippia macrophylla Cham. = Lantana macrophylla (Cham.) Schau.

Lippia macrophylla R. A. Phil. = Acantholippia deserticola (F. Phil.) Moldenke

Lippia macropoda Torr. = Lantana macropoda Torr.

Lippia macrostachya Torr. = Aloysia macrostachya (Torr.) Moldenke

Lippia macrostachya (Torr.) Moldenke = Aloysia macrostachya (Torr.) Moldenke
Lippia macrostachya S. Wats. = Aloysia macrostachya (Torr.) Moldenke
Lippia macrostachys Watson = Aloysia macrostachya (Torr.) Moldenke
Lippia maldonadoi Moldenke = Lantana xenica Moldenke
Lippia maritima Kearney = Phyla lanceolata (Michx.) Greene
Lippia mexicana Hocking = Phyla scaberrima (A. L. Juss.) Moldenke
Lippia micrantha Briq. = Lantana micrantha Briq.
Lippia microphylla R. A. Phil. = Acantholippia deserticola (F. Phil.) Moldenke
Lippia modiflora L. = Phyla nodiflora (L.) Greene
Lippia modiflora (L.) Michx. = Phyla nodiflora (L.) Greene
Lippia montana T. S. Brandeg. = Aloysia barbata (T. S. Brandeg.) Moldenke
Lippia montevidensis Spreng. = Lantana montevidensis (Spreng.) Briq.
Lippia myrtifolia Griseb. = Nashia myrtifolia (Griseb.) Moldenke
Lippia nahuire Gentry = Aloysia nahuire Gentry & Moldenke
Lippia nipensis Urb. = Nashia nipensis (Urb.) Moldenke
Lippia nodiflora Birch = Phyla nodiflora (L.) Greene
Lippia nodiflora Cham. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora Eggers = Phyla nodiflora var. reptans (H.B. K.) Moldenke
Lippia nodiflora H.B.K. = Phyla nodiflora (L.) Greene
Lippia nodiflora L. = Phyla nodiflora (L.) Greene
Lippia nodiflora (L.) Boiss. = Phyla nodiflora (L.) Greene
Lippia nodiflora (L.) DC. = Phyla nodiflora (L.) Greene
Lippia nodiflora (L.) Eich. = Phyla nodiflora (L.) Greene
Lippia nodiflora (L.) Michx. = Phyla nodiflora (L.) Greene
Lippia nodiflora (L.) Rich. = Phyla nodiflora (L.) Greene
Lippia nodiflora Lam. = Phyla nodiflora (L.) Greene
Lippia nodiflora Michx. = Phyla nodiflora (L.) Greene
Lippia nodiflora Millsp. = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia nodiflora Pinch = Phyla nodiflora (L.) Greene
Lippia nodiflora Reichenb. = Phyla nodiflora (L.) Greene
Lippia nodiflora A. Rich. = Phyla nodiflora (L.) Greene
Lippia nodiflora L. C. Rich. = Phyla nodiflora (L.) Greene
Lippia nodiflora (Rich.) Michx. = Phyla nodiflora (L.) Greene
Lippia nodiflora Robinson & Greenm. = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia nodiflora Rouy = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora Schau. = Phyla nodiflora (L.) Greene

Lippia nodiflora repens Fern. = Phyla nodiflora (L.) Greene
Lippia nodiflora f. repens Knoche = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora race repens Rouy = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora subsp. canescens (H.B.K.) Reyn. = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia nodiflora subsp. canescens Reyn. = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia nodiflora subsp. canescens f. pseudosarmentosa Reyn. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora subsp. canescens f. pseudo-sarmentosa Reyn. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora subsp. repens Rouy = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora var. acutifolia Kuntze = Phyla lanceolata (Michx.) Greene
Lippia nodiflora var. brevipes Planch. = Phyla nodiflora (L.) Greene
Lippia nodiflora var. canescens Fiori = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora var. canescens (H.B.K.) Kuntze = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia nodiflora var. canescens (Kunth) Kuntze = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia nodiflora var. lanceolata (Michx.) Kuntze = Phyla lanceolata (Michx.) Greene
Lippia nodiflora var. normalis Kuntze = Phyla nodiflora (L.) Greene
Lippia nodiflora var. normalis f. brevipes Kuntze = Phyla strigulosa var. parvifolia (Moldenke) Moldenke
Lippia nodiflora var. normalis f. brevipes Planch. = Phyla nodiflora (L.) Greene
Lippia nodiflora var. normalis f. canescens (H.B.K.) Kuntze = Phyla nodiflora var. canescens (H.B.K.) Moldenke
Lippia nodiflora var. normalis f. sericea Kuntze = Phyla strigulosa var. parvifolia (Moldenke) Moldenke
Lippia nodiflora var. pusilla Briq. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora var. repanda (H.B.K.) Kuntze = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia nodiflora var. repens (Bertol.) Schau. = Phyla nodiflora (L.) Greene
Lippia nodiflora var. repens Schau. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia nodiflora var. repens (Spreng.) Briq. = Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia nodiflora var. reptans (H.B.K.) Kuntze = Phyla nodiflora var. reptans (H.B.K.) Moldenke

Lippia nodiflora var. rosea D. Don = Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia nodiflora var. sarmentosa Cavara = Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia nodiflora var. sarmentosa Schau. = Phyla nodiflora (L.) Greene

Lippia nodiflora var. sarmentosa Spreng. = Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia nodiflora var. sarmentosa (Willd.) Schau. = Phyla nodiflora (L.) Greene

Lippia nodiflora var. sericea Kuntze = Phyla strigulosa var. parvifolia (Moldenke) Moldenke

Lippia nodiflora var. sericea f. brevipes Kuntze = Phyla strigulosa var. parvifolia (Moldenke) Moldenke

Lippia nodiflora var. subsessilis Bornm. = Phyla nodiflora var. subsessilis (Bornm.) Moldenke

Lippia nodiflora var. tarraconensis Sennen = Phyla nodiflora (L.) Greene

Lippia nodiflora var. β repens Schau. = Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia nodiflora α sarmentosa Schau. = Phyla nodiflora (L.) Greene

Lippia nodiflora α vulgaris Walp. = Phyla nodiflora (L.) Greene

Lippia nodiflora β arenaria Walp. = ?Phyla nodiflora var. canescens (H.B.K.) Moldenke

Lippia nodiflora β repens Schau. = Phyla nodiflora (L.) Greene

Lippia nodiflora γ debilis Walp. = ?Phyla nodiflora var. rosea (D. Don) Moldenke

Lippia nodiflora δ umbrosa Walp. = Phyla strigulosa (Mart. & Gal.) Moldenke

Lippia nodoflora (L.) Michx. = Phyla nodiflora (L.) Greene

Lippia nodoflora Michx. = Phyla nodiflora (L.) Greene

Lippia nodosa L. = Phyla nodiflora (L.) Greene

Lippia noduliflora L. = Phyla nodiflora (L.) Greene

Lippia nudiflora (L.) Michx. = Phyla nodiflora (L.) Greene

Lippia oligophylla Baker = Acrocephalus villosus Benth., Lamiaceae

Lippia ovata L. = Microdon ovatus (L.) Choisy, Selaginaceae

Lippia pallescens Benth. = Lantana canescens H.B.K.

Lippia pavoniana Briq. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.

Lippia peruviana Turcz. = Aloysia peruviana (Turcz.) Moldenke

Lippia polygalaefolia Steud. = Aloysia polygalaefolia Cham.

Lippia polystachya Griseb. = Aloysia polystachya (Griseb.) Moldenke

Lippia pulchra Briq. = Aloysia pulchra (Briq.) Moldenke
Lippia purpurea Dum.-Cours. = Lantana trifolia L.
Lippia purpurea Gray = Lantana macropoda Torr.
Lippia purpurea Jacq. = Lantana achyranthifolia Desf.
Lippia purpurea Jacq. f. = Lantana achyranthifolia Desf.
Lippia purpurea Spreng. = Lantana achyranthifolia Desf.
Lippia queratensis H.B.K. = Phyla strigulosa (Mart. & Gal.) Moldenke
Lippia queretanensis Humb. & Bonpl. = Phyla strigulosa (Mart. & Gal.) Moldenke
Lippia queretarensis Kunth = Phyla strigulosa (Mart. & Gal.) Moldenke
Lippia quereturensis Humb. & Bonpl. = Phyla strigulosa (Mart. & Gal.) Moldenke
Lippia radula Mart. = Lantana aristata (Schau.) Briq.
Lippia repens Frch. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia repens Hort. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia repens Rouy = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia repens Sch. = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia repens Spreng. = Phyla nodiflora (L.) Greene
Lippia repens var. decumbens Bonati = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia reptans H.B.K. = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia reptans Kunth = Phyla nodiflora var. reptans (H.B.K.) Moldenke
Lippia riojana Hieron. = Acantholippia riojana Hieron. & Moldenke
Lippia riorjana Hieron. = Acantholippia riojana Hieron. & Moldenke
Lippia rubiginosa Gill. = Acantholippia seriphioides (A. Gray) Moldenke
Lippia salsoloides Benth. & Hook. f.= Acantholippia deserticola (F. Phil.) Moldenke
Lippia salsoloides Briq, = Acantholippia deserticola (F. Phil.) Moldenke
Lippia salsoloides (Griseb.) Benth. = Acantholippia deserticola (F. Phil.) Moldenke
Lippia salsoloides (Griseb.) Benth. & Hook. = Acantholippia deserticola (F. Phil.) Moldenke
Lippia salsoloides (Griseb.) Briq. = Acantholippia deserticola (F. Phil.) Moldenke
Lippia sarmentosa Spreng. = Phyla nodiflora (L.) Greene
Lippia sarmentosa (Willd.) Spreng. = Phyla nodiflora (L.) Greene
Lippia schickendantzii Hieron. = Lantana balansae Briq.
Lippia schimperi Hochst. = Lantana viburnoides (Forsk.) Vahl
Lippia scirpea R. A. Phil. = Diostea juncea (Gill. & Hook.) Miers
Lippia scordioides S. Wats. = Aloysia scorodonioides (H.B.K.) Cham.

Lippia scordonioides Humb. & Kunth = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scordonioides H.B.K. = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scordonoides H.B.K. = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scorodonioides Bonpl. = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scorodonioides (Cham.) Kunth = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scorodonioides Humb. & Bonpl. = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scorodonioides H.B.K. = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scorodonioides Kunth = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scorodonioïdes H.B.K. = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scorodonioides var. detonsa Briq. = Aloysia scorodonioides var. detonsa (Briq.) Moldenke
Lippia scorodonioides var. hypoleuca Briq. = Aloysia scorodonioides (H.B.K.) Cham.
Lippia scorodonioides var. macrostachya Gregg = Aloysa macrostachya (Torr.) Moldenke
Lippia scorodonioides var. mathewsii Briq. = Aloysia scorodonioides var. mathewsii (Briq.) Moldenke
Lippia scoronioides H.B.K. = Aloysia scorodonioides (H.B.K.) Cham.
Lippia sellowi Briq. = Aloysia sellowii (Briq.) Moldenke
Lippia sellowii Briq. = Aloysia sellowii (Briq.) Moldenke
Lippia seriphioides A. Gray = Acantholippia seriphioides (A. Gray) Moldenke
Lippia seriphioides Gris. = Acantholippia seriphioides (A. Gray) Moldenke
Lippia spathulata Hayek = Aloysia spathulata (Hayek) Moldenke
Lippia spathulatoides Loes. = Aloysia scorodonioides var. mathewsii (Briq.) Moldenke
Lippia spinifera Urb. = Nashia spinifera (Urb.) Moldenke
Lippia spiraeoides Mart. = Aloysia sellowii (Briq.) Moldenke
Lippia stachidifolia H.B.K. = Phyla stoechadifolia (L.) Small
Lippia stachydaefolia Wright = Phyla stoechadifolia (L.) Small
Lippia staechadifolia H.B.K. = Phyla stoechadifolia (L.) Small
Lippia stoechadifolia Humb. & Bonpl. = Phyla stoechadifolia (L.) Small
Lippia stoechadifolia Humb. & Kunth = Phyla stoechadifolia (L.) Small
Lippia stoechadifolia H.B.K. = Phyla stoechadifolia (L.) Small
Lippia stoechadifolia Kunth = Phyla stoechadifolia (L.) Small
Lippia stoechadifolia (L.) H.B.K. = Phyla stoechadifolia (L.)

Small
Lippia stoechas Briq. = Lavandula stoechas L., Lamiaceae
Lippia stoechiadifolia (L.) H.B.K. = Phyla stoechadifolia (L.) Small
Lippia stoichadifolia (L.) H. B. K. = Phyla stoechadifolia (L.) Small
Lippia storchiadifolia (L.) H.B.K. = Phyla stoechadifolia (L.) Small
Lippia strigulosa Mart. & Gal. = Phyla strigulosa (Mart. & Gal.) Moldenke
Lippia subterranea Rusby = Phyla subterranea (Rusby) Moldenke
Lippia tiliaefolia Cham. = Lantana tiliaefolia Cham.
Lippia trifida Clos. = Acantholippia trifida (C. Gay) Moldenke
Lippia trifida C. Gay = Acantholippia trifida (C. Gay) Moldenke
Lippia trifida R. A. Phil. = Acantholippia deserticola (F. Phil.) Moldenke
Lippia trifida Remy = Acantholippia trifida (C. Gay) Moldenke
Lippia triphylla Kuntze = Aloysia triphylla (L'Hér.) Britton
Lippia triphylla (L'Hér.) Kuntze = Aloysia triphylla (L'Hér.) Britton
Lippia turnerifolia Hieron. = Lantana aristata var. angustifolia (Kuntze) Moldenke
Lippia turnerifolia var. camporum Griseb. = Lantana brasiliensis Link
Lippia uncinuligera Nees = Phyla nodiflora var. rosea (D. Don) Moldenke
Lippia urticifolia Steud. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia urticoides Cham. & Schlecht. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia urticoides (Cham.) Steud. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia urticoides Schau. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia urticoides Steud. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia urticoides Steud. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia urticoides var. laxa Chod. = Aloysia virgata var. laxa (Chod.) Moldenke
Lippia urticoides var. platyphylla Briq. = Aloysia virgata var. platyphylla (Briq.) Moldenke
Lippia urticoides β parvifolia Mart. = Aloysia gratissima (Gill. & Hook.) Troncoso
Lippia urticolides Steud. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia valerianoides Walp. = Valeriana sp., Valerianaceae

Lippia variifolia Urb. = Nashia variifolia (Urb.) Moldenke
Lippia venosa Rusby = Lantana canescens H.B.K.
Lippia viburnoides Vahl = Lantana viburnoides (Forsk.) Vahl
Lippia virgata (Ruíz & Pav.) Steud. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia virgata Stend. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia virgata Steud. = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia virgata var. elliptica Briq. = Aloysia virgata var. elliptica (Briq.) Moldenke
Lippia virgata var. laxa Briq. = Aloysia virgata var. laxa (Chod.) Moldenke
Lippia virgata var. platyphylla Briq. = Aloysia virgata var. platyphylla (Briq.) Moldenke
Lippia viricifolia Heiner = Aloysia virgata (Ruíz & Pav.) A. L. Juss.
Lippia wrightii A. Gray = Aloysia wrightii (A. Gray) Heller

LIPPIA ABYSSINICA (Otto & Dietr.) Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 790. 1962.

Synonymy: Lantana polycephala R. Br. in Salt, Voy. Abyss. App. 65, nom. nud. 1814 [not Lippia polycephala Briq., 1904]. Lippia adoënsis Hochst., Flora 24, Intell. 1: 23, nom. nud. 1841. Lantana abyssinica Otto & Dietr., Allg. Gartenzeit. 9: 379. 1841. Lippia schimperi Walp., Repert. Syst. Bot. 4: 53. 1845 [not L. schimperi Hochst., 1841]. Lippia adoensis Hochst. ex Walp., Repert, Bot. Syst. 4: 55. 1845.

Bibliography: R. Br. in Salt, Voy. Abyss. App. 65. 1814; Otto & Dietr., Allg. Gartenzeit. 9: 379. 1841; Hochst., Flora 25, Intell. 1: 23. 1841; Walp., Repert. Bot. Syst. 4: 53 & 55--56. 1845; Schau. in A. DC., Prodr. 11: 578--579. 1847; A. Rich., Tent. Fl. Abyss. 2: 167. 1851; Bocq., Adansonia 3: 244. 1863; Aschers. in G. Schweinf., Beitr. Fl. Aethiop. 278. 1867; D. Oliv., Trans. Linn. Soc. Lond. Bot. 29: 132. 1875; Moloney, Sketch Forest. W. Afr. 523. 1887; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1894; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95 & 96. 1894; Gürke in Engl., Pfl. Ost-Afr. C: 337. 1895; J. G. Baker in Thistel.-Dyer, Fl. Trop. Afr. 5: 278 & 280--281. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902; De Wild., Etud. Fl. Bangala & Ubangi 246. 1911; A. Chev., Etud. Fl. Afr. Cent. Franç. 1: 242. 1913; Holland, Kew Bull. Addit. Ser. 9: 517--518. 1915; Gerth van Wijk, Dict. Plantnames 2: 532. 1916; A. Chev., Expl. Bot. Afr. Accid. Franç. 1: 503. 1920; Hutchins. & Dalz., Fl. W. Trop. Afr. 2 (1): 270. 1931; Moldenke, Alph. List Common Names 13. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 45--47, 49, 50, & 95. 1942; Moldenke, Alph. List Invalid Names 27 & 32. 1942; Darlington & Janaki Ammal, Chromosome Atlas 271. 1945; Moldenke, Phytologia 2: 65, 67, 71--74, 76, 79, 80, 83, 84, & 106--107 (1945) and 2: 339 & 340. 1947; Robyns, Fl. Spermat. Parc Nat. Albert 2: 138--139 & 616. 1947; Moldenke, Alph. List Invalid Names

Suppl. 1: 12. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 82. 1948; Moldenke, Alph. List Cit. 2: 416 (1948) and 3: 901. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 110, 111, 113, 115, 116, 118, 119, & 189. 1949; Moldenke, Phytologia 3: 137 (1949) and 3: 378. 1950; Moldenke, Résumé 134—138, 142, 143, 146, 147, 302, 306, 317, & 460. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 790. 1962; Hocking, Excerpt. Bot. A.5: 45. 1962; Cuf., Senck. Biol. 43: 282 & 329. 1962; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Index 1961: 60 (1962) and 1962: 63. 1963; Moldenke, Résumé Suppl. 7: 8 (1963), 8: 4 (1964), and 11: 7. 1964.

Woody or semi-woody herb, to 2 m. tall, or bush to undershrub, to 4 m. tall, erect; stems strict or branched, becoming suffrutescent and as thick as a man's arm, subhexagonal, strigose-hispid and rough with callose hairs; branchlets short-pubescent; upper internodes sometimes elongate; leaves decussate-opposite, ternate, or in 4's, sometimes even more in a whorl, sessile or subsessile; leaf-blades subcoriaceous, oblong or oblong-lanceolate or oblanceolate-oblong, acuminate at the apex, attenuate at the base, serrate from the middle upwards or obscurely crenate, revolute along the margins, lineate-wrinkled and subrugose as well as rather scabrous or hispid-scabrous and shiny on the upper surface, thinly pubescent or setose and glandular-punctate as well as paler beneath, the lower ones sometimes 10—12.5 cm. long and 2.5 cm. wide, usually gradually smaller toward the apex of the flowering stems or sometimes more uniform in size throughout; inflorescence axillary, in the upper leaf-axils, usually much surpassed by the subtending leaves; peduncles slender, axillary, rigid, short or even very short, 1—1.3 cm. long, single or several in each upper leaf-axils, strigose-hispid and rough with callose hairs; heads small, numerous, permanently globose, many-flowered, 6—7 mm. wide; bractlets multifarious, ovate, acuminate or cuspidate at the apex, twice as long as the calyx and subequaling the corolla, squarrose, rigid, canescent-hairy, the outer ones 3 mm. wide; flowers odorous or with very little scent; calyx about 1.5 mm. long, completely white-villous, the hairs bifarious, long, [Schauer says: "villo disci appresso, laterum vero pectinate patente"]; corolla hypocrateriform, white or whitish to cream or pale-yellow, rarely lilac or the color of heliotrope (Heliotropium arborescens) with a yellow center, subequaling the subtending bractlet, canescent-hirtellous on the outer surface.

The original description of this plant by Otto & Dietrich (1841) is most important and is reproduced herewith: "L. ramis inermibus; foliis verticillatis ternis, brevissime petiolatis, lanceolatis, acutis, basi attenuatis, supra rugosis scabris, subtus subvillosis; capitulis axillaribus, verticillatis, breviter pedunculatis, subglobosis; bracteis ex ovata basi longe acuminatis, tubum corollae aequantibus. Sehr wahrscheinlich ist dies die L. polycephala Rob. Br., die dieser gelehrte Botaniker in dem Verzeichniss der Pflanzen von Congo, jedoch nur namentlich, auffführt, weshalb sich dies auch nur vermuthen, aber nicht bestimmt erweisen lässt. Es scheint übrings gar keine Lantana zu sein, sondern zu

Lippia oder Zapania zu gehören, was übringens auch ohne Ansicht der Früchte nicht zu bestimmen ist. — Sie wurde aus Samen von Herrn Schimper unter Nr. 305 eingeführt, und uns vom Herrn Garten-Inspector Held in Karlsruh mitgetheilt. Die Pflanze ist halb strauchartig, mit langen krautartigen Aesten, die unbewaffnet, und mit kurzen anliegenden Haaren besetzt und dadurch scharf sind. Die Blätter stehen quirlförmig an drei um den Stengel, sind ganz kurz gestielt mit kaum über eine Linie langen Blattstielen, sind drei Zoll und darüber lang, einen Zoll breit, lanzettförmig, spitz, an der Basis in den Blattstiel verschmälert, sehr dicht und fein gekerbt, auf der Oberfläche runzelig, scharf und zerstreut kurzhaarig, auf der Unterfläche etwas bleicher, weicher und kurzzottig. Die Blüthenköpfe stehen in jeder Blattquirlachsel gewöhnlich zu sechs, an ungefähr einen Zoll langen, zottigen Blumenstielen, sind fast kugelrund, nicht grösser als eine starke Erbse, und sich nach dem Blühen wahrscheinlich etwas verlängernd. Die Deckblätter sind an der Basis breit und eirund, verschmälern sich dann aber plötzlich in eine lange schmale Spitze, die jedoch die Blumenkronen nicht überragt; sie sind zottig und bewimpert. Die Blumenkronen sind weisz, mit einer schwach ins Graue gehenden Färbung. Die Blüthen haben einen starken Citronengeruch." They say of it "habitat in Abyssinia ♄ " Cufodontis (1962) says: "Type: cultus in h. Karlsruhe e seminibus ex Abyssinia, Schimper 305."

Richard (1851) says of L. adoënsis: "C'est une espèce excessivement polymorphe: tantôt tomenteuse et l'un gris cendré, tantôt brunâtre, et à poils écartés et très-rudes. Ses feuilles sont ou ovales allongées aiguës, ou étroites et lancéolées, toujours marquées de dentelures fines dans leur contour, excepté vers la partie inférieure de leurs bords qui est entière; les capitules sont longuement pédonculés, groupés au nombre de trois à quatre à l'aisselle des feuilles supérieures. La surface supérieure des feuilles est comme bulleuse et chagrinée."

The type of Lippia adoënsis was collected by Georg Heinrich Wilhelm Schimper (no. II.1079) on mountainsides close to deep valleys at Ferrfera, Abyssinia, and was deposited in the herbarium of the Botanisches Museum at Berlin, but is now destroyed. It is worth noting here that Lippia schimperi Hochst. is a synonym of Lantana viburnoides (Forsk.) Vahl.

Schauer (1847) and Schumann (1902) regard L. grandifolia Hochst. as a synonym of the species here under discussion, but in my opinion the characters given by Richard (1851) as separating these two species are quite valid and adequate, so I am regarding them as two separate taxa, albeit closely related to each other [cfr. L. grandifolia in this present series of notes]. I have seen type material of both L. grandifolia [Schimper II.734] and of L. adoënsis [Schimper II.1079]. Hutchinson goes so far as to add even L. rugosa A. Chev. to this synonymy. If this were true, then the statements made by some authors that the inflorescence of L. abyssinica is "very variable, the very numerous heads sometimes

forming a dense terminal panicle" would have justification. Certain authors also make the assertion that the leaves "barely exceed the peduncles in length in the inflorescence"; actually I have often seen them as large there as farther down the stem in the true L. abyssinica.

The species is a member of Section Dipterocalyx, and has been found growing on savannas or Combretum savannas, in grasslands, among underbrush, and at the edge of water, as well as on steep mountainsides adjacent to deep valleys, at altitudes of 1000 to 2500 meters, flowering in May, August, October, and November, and fruiting in May and August. A notation on A. Chevalier 10655 avers that it is employed in internal medicine in Ubangi. Holland (1915) reports its use medicinally by the natives of Nigeria.

In regard to the color of the flowers: they are described as "white" on A. Chevalier 5395 & 5396; "whitish" by J. G. Baker; "cream-color" on H. M. Gardner 3727; "pale-yellow" on Lugard 109; and "the color of the heliotrope of gardens" on J. O. Cooper s.n.

Common and vernacular names recorded for the species include "afurati", "bahé", "bahé bahé", "bambara", "bormbor", "borom-borom", "bonoumou", "bush tea", "chessehié", "dama-kasse", "diohuli", "efinrin-gogara", "fasau", "fetfetti", "fetfettis", "foulah", "fuban", "Gambia tea", "gane ba", "ganéba", "guéri", "guilel", "kani ba", "kasí", "kimbo", "kingkilli ba", "koulikoro", "mbalhat", "mbormbor", "ngãsu", "ngãsuru", "nyŏna", "saa-nunum", and "sisiling hyamo".

Material of this species has been misidentified and distributed in herbaria under the name Lantana viburnoides Vahl. On the other hand, the Dawe 30, distributed as L. adoënsis, is actually L. chevalierii Moldenke, Humbert 8182 is L. grandifolia Hochst., Schlieben 319 is L. javanica (Burm. f.) Spreng., and Lely 115 and Gossweiler 11070 are L. nigeriensis Moldenke.

Baker (1900) distinguishes the tropical African species of Lippia known to him as follows:

1. Bractlets orbicular, obtuse at the apex.
   2. Peduncles very short.....L. oatesii Rolfe.
   2a. Peduncles elongate.....L. radula J. G. Baker.
1a. Bractlets not orbicular, not obtuse at the apex.
   3. Bractlets cuspidate at the apex.
      4. Leaves small.
         5. Leaf-blades orbicular to obovate....L. somalensis Vatke.
         5a. Leaf-blades oblong, rugose.L. javanica (Burm.f.) Spreng.
      4a. Leaves larger, oblong or oblanceolate-oblong, scarcely rugose.....L. abyssinica (Otto & Dietr.) Cuf.
3a. Bractlets not cuspidate.
   6. Bractlets acuminate at the apex.
      7. Leaves decussate-opposite.....L. ukambensis Vatke.
      7a. Leaves ternate.....L. burtonii J. G. Baker.
   6a. Bractlets merely acute at the apex.L. plicata J. G. Baker.

Chevalier (1920) cites his no. 2771 and two s.n. collections from Senegal, his 12948 and Caille 14772 & 18059 from French Guinea, and his 67, 307, 2772, and three s.n. collections from French Soudan. I regard Chevalier 67 and Caille 14772 as representing L. chevalierii Moldenke.

De Wildeman (1911) cites Thonner 234 from Bangala & Ubangi. Baker (1900) cites the following: MALI: Senegambia: Thierry 227. ABYSSINIA: Plowden s.n.; Quartin-Dillon s.n. [Maigouagoua]; Schimper 42, 734, & 1079. SENEGAL: Heudelot 103. GAMBIA: Brown-Lester 4 & 28; Ingram s.n. SIERRA LEONE: Scott-Elliot 4262, 4285, & 4878. NIGERIA: Baikie 11; Barter 768; Millen 143. CONGO LEOPOLDVILLE: Burton s.n.; Dupuis s.n. [Bingila]; Smith s.n.; Soyaux 67. UGANDA: Wilson 130. KENYA: Petherick s.n. [Neangara]; Schweinfurth 2230 & 2687; Speke & Grant s.n. [Unyoro]. ANGOLA: Johnston s.n.; Monteiro s.n.; Welwitsch 5627 & 2741.

Chevalier (1913) cites his nos. 5395, 5396, 7483, & 10655 from Ubangi-Chari in the Central African Republic. Hutchinson & Dalziel (1931) say of this species that it inhabits chiefly the grass savannas and is found in "Senegal and French Sudan to Northern Nigeria and Lagos Colony, extends to eastern and southern tropical Africa." They cite Baikie 11; Barter 768; Brown-Lester 4 & 28; Chevalier 20410; Dalziel 177; Heudelot 103; Ingram s.n.; Johnson 542 & 584; Mildbraed 7238; Millen 143; Scott Elliot 4262, 4285, & 4878; and Thierry 227. However, I regard Brown-Lester 4 & 28, Ingram s.n., and Thierry 227 as L. chevalierii Moldenke. Not having as yet seen any of the other collections cited, I am not at all certain that all (or any) of them really represent L. abyssinica.

In all, 16 herbarium specimens, including the type collections of at least some of the names involved, and 12 mounted photographs of L. abyssinica have been examined by me.

Citations: ERITREA: Pappi 2176 (S), 5602 (Ca--994347). ETHIOPIA: J. O. Cooper s.n. [Djem-Djem Forest, IX.X.26] (K); Quartin-Dillon s.n. [1862] (F--photo, K, N--photo, Sg--photo, Z--photo); Schimper 42 (F--photo, K, N--photo, Sg--photo, Z--photo), 464 (B), II.1079 (B, E--116703), III.1452 (E--116704, F--photo, N, N--photo, S, Si--photo, Z--photo). CONGO LEOPOLDVILLE: Lebrun 4588 (K). UGANDA: Lugard 109 (K, N). KENYA: V. Bogden VB.555 (Ca--984106); H. M. Gardner 3727 (K).

LIPPIA ABYSSINICA var. PUBESCENS (Moldenke) Moldenke, comb. nov.

Synonymy: Lippia adoënsis var. pubescens Moldenke, Phytologia 8: 58. 1961.

Bibliography: Moldenke, Phytologia 8: 58. 1961; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Index 1961: 60. 1962; Moldenke, Résumé Suppl. 3: 16. 1962; Hocking, Excerpt. Bot. A.5: 45. 1962.

This variety differs from the typical form of the species in having its stems and branches, as well as the under surface of the leaves, densely brown-pubescent.

The type of the variety was collected by B. B. Drummond and J. H. Hemsley (no. 4496) on a grassy hillside with scattered shrubs and shrub thickets, subject to burning, at Katera, at an altitude of 1200 meters, Maskara district, Uganda, on October 1, 1953, and is deposited in the herbarium of the Botanisches Museum at Berlin.

In all, only 2 herbarium specimens, including the type, have been examined by me.

Citations: UGANDA: Drummond & Hemsley 4496 (B--type, Z--isotype).

LIPPIA ACUMINATA C. Wright ex Griseb., Cat. Pl. Cuba 215. 1866.

Bibliography: Griseb., Cat. Pl. Cuba 215. 1866; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25 & 95. 1942; Moldenke, Phytologia 2: 384. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 44 & 189. 1949; Moldenke, Alph. List Cit. 4: 1258. 1949; Alain in León & Alain, Fl. Cuba 4: 288 & 289. 1957; Moldenke, Résumé 52 & 460. 1959.

Shrub, 2--3 m. tall, conspicuously odorous; stems frutescent, tetragonal, subglabrous; leaves ovate, 3--5 cm. long, about 4 cm. wide, acuminate at the apex, serrate toward the apex, cuneate-rounded and entire at the base, short-petiolate, strigillose above and very shortly scabrous, subglabrous beneath except for dense glandular dots; heads subglobose, finally becoming short-oblong; peduncles axillary, very short, shorter than the petiole; bractlets subrotund, cuspidate at the apex, subglabrous, subequaling the corollas; calyx very minute, subcylindric, obtusely bilobed, many times shorter than the corolla-tube; corolla white.

The type of this rare species was collected by Charles Wright (no. 3162) somewhere in western Cuba ["Cuba occ."] between 1860 and 1864, and is deposited in the Sauvalle Herbarium at the Academia de Ciencias in Havana, Cuba. The species has been collected in rocky places, at the base of cliffs, and on mountaintops, at altitudes of 950 to 1000 meters, in flower in July, and in fruit in January and March.

In all, 5 herbarium specimens, including the type, and 8 mounted photographs have been examined by me.

Citations: CUBA: Las Villas: Alain 6373 (Z); Ekman 16243 (F--photo, N, N--photo, S, Si--photo, Z--photo), 18959 (S). Province undetermined: C. Wright 3162 [Cuba occ.; Herb. Sauvalle 1758] (F--photo of type, Hv--type, Hv--isotype, N--photo of type, Si--photo of type, Z--photo of type).

LIPPIA ACUTIDENS Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 590--591. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 590--591. 1847; Schau. in Mart., Fl. Bras. 9: 246--247. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1:

223 (1946) and 3: 691 & 712. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; Moldenke, Résumé 92 & 460. 1959.

Shrub, to about 2 m. tall; stems erect, subsimple, tetragonal, smooth; branches tetragonal, pubescent; leaves decussate-opposite, rather heavy or coriaceous, ovate or subrotund, very short-petiolate, almost 2 cm. long, 0.8--1 cm. wide, apparently quickly deciduous, entire at the base, acutely dentate at the apex, rigidly ciliate, the teeth somewhat prickly, prominently venose beneath, glabrous and shiny on both surfaces when adult; heads short-pedunculate, eventually subspicate, solitary in the leaf-axils, subcorymbose-congested at the apex of the branches; bractlets squarrose, subherbaceous-membranous, concave, broadly ovate, 3-nerved, subtomentose-hirsute, the acumen declinate; calyx villous, 2-parted, the lobes obtuse at the apex; corolla rose, yellowish in the throat, hirtellous on the outer surface, its tube 4 mm. long, equaling the subtending bractlet, swollen at the midpoint, the limb bent downwards, velutinous on the upper surface; fruit adhering to the calyx, recondite, oblong, one of the pyrenes often tabescent.

The type of this apparently rare species was collected by Carl Friedrich Philipp von Martius in fields at Yha, Minas Gerais, Brazil, adjoining the boundary of Goías, in September, 1818, and is deposited in the Martius Herbarium at the Botanisches Museum in Munich. The species is a member of the Section Euzapania, Subsection Corymbosae. It has been collected in flower and fruit in May, July, and September.

In all, 4 herbarium specimens and 4 phototypes have been examined by me.

Citations: BRAZIL: Maranhão: Murça Pires & Black 1624a (Be--50206), 2342 (Be--58767). Minas Gerais: Martius s.n. [Yha; Macbride photos 20319] (Kr--photo of type, N--photo of type). Piaui: G. Gardner 2940 (M, N).

LIPPIA ADPRESSA Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906.

Bibliography: Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906; Prain, Ind. Kew. Suppl. 4: 142. 1913; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 189. 1949; Moldenke, Alph. List Cit. 3: 695 (1949) and 4: 1296. 1949; Moldenke, Résumé 92 & 460. 1959; Moldenke, Résumé Suppl. 8: 2. 1964.

Subshrub, about 50 cm. tall; branches few, elongate, appressed-pubescent; leaves decussate-opposite, sessile, imbricate, about 1 cm. long, ovate, deeply cordate at the base, subacute at the apex, revolute along the margins, appressed to the stem, flat, serrulate toward the apex, smooth above, glistening subsericeous-tomentose beneath; inflorescence capitate, the heads aggregate at the tips of the branches, in the axils of the uppermost leaves; peduncles subequaling the subtending leaves; bractlets ovate-lanceolate, about 5 mm. long, acute at the apex, sericeous-villous; corolla surpassing the bractlets, glabrous.

The type of this rare species was collected by George Gardner (no. 3933) in Goías, Brazil, and is deposited in the herbarium of the Naturhistorisches Museum in Vienna, where it was photographed by Macbride as his type photograph no. 34328. Hayek comments "Habitu Lippiae teguliferae Briq.....non dissimilis, foliis autem omnino planis nequaquam nervoso-rugosis, indumento alieno capitulisque longius petiolatis valde diversa." The original description gives Gardner 2933 as the type collection, but this appears to be a typographic error for "3933" as is plainly indicated on the Vienna holotype.

Thus far, only 2 herbarium specimens and 3 phototypes have been examined by me.

Citations: BRAZIL: Brasilia: Murça Pires, Silva, & Souza 9669 (Lw, Z). Goías: G. Gardner 3933 [Macbride photos 34328] (It--photo of type, Kr--photo of type, N--photo of type).

LIPPIA AFFINIS Schau. in A. DC., Prodr. 11: 576. 1847 [not L. affinis Briq., 1896].

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Shrub or bush, 0.8--2 m. tall; branchlets subterete, tomentose; leaves decussate-opposite; petioles very slender, about 1.1 cm. long; leaf-blades ovate, to 3.3 cm. long and 1.6 cm. wide, acute at the apex, rounded or subcordate at the base, crenate along the margins, penninerved, rugose and beautifully holosericeous above, incano-tomentose beneath; peduncles axillary, aggregate, flaccid, pulverulent-glandulose and incano-villous; heads 4-angled, ovoid, reaching to about the middle of the subtending leaf; bractlets green, ovate, equaling the corolla-tube, complicate-acuminate, patulous, pulverulent-glandulose and incano-villous, the acumen turned inwards; corolla hypocrateriform, white or yellowish.

The type of this perplexing species was collected by Guilherme Schüch de Capanema and Ludwig Riedel somewhere in Brazil and was deposited in the herbarium of the Botanisches Museum at Berlin, now unfortunately destroyed. The species is a member of the Section Goniostachyum along with such closely related species as L.

graveolens H.B.K., L. origanoides H.B.K., L. glandulosa Schau., L. elegans Cham., L. gracilis Schau., L. martiana Schau., L. obscura Briq., L. pendula Rusby, L. rubiginosa Schau., L. salviaefolia Cham., L. schomburgkiana Schau., L. sidoides Cham., L. velutina Schau., and others. Schauer (1851) says "Lippiae microphyllae accedit capitulis et fere indumento, recedit tamen ab ea foliorum figura et magnitudino L. origanoidi primo intuitu similis apparet, differt vero bracteis et foliis basi rotundatis."

Lippia affinis has been found on campos and in scrubby open woods, at altitudes of 600 to 2000 meters, blooming in January, February, April, and November. Mexia reports it "common locally" at Fazenda do Diamante, where it is made into a tea and is used in the treatment of dysentery. The corolla is reported as white on F. C. Hoehne s.n. [Herb. Inst. Bot. S. Paulo 2754 & 5217], Sampaio 6829, Mexia 5625, and Williams & Assis 5809, and as yellowish on Mendes Magalhães 2507. Common names reported for the species are "camará", "orégano", "oregano di burro", and "poleo". Calpouzos (1954) points out that this is one of the many plants called "oregano", "oregeno", "origano", or "oragano" along with L. formosa T. S. Brandeg., L. fragrans Turcz., L. graveolens H.B.K., L. micromera Schau., L. micromera var. helleri (Britton) Moldenke, L. origanoides H.B.K., L. palmeri S. Wats., L. palmeri var. spicata Rose, L. pendula Rusby, Lantana involucrata L., L. achyranthifolia Desf., L. trifolia L., Coleus amboinicus Lour., Hedeoma floribunda Standl., H. patens Jones, Hyptis albida H.B.K., H. americana (Aubl.) Urb., H. capitata Jacq., H. suaveolens (L.) Poit., Limnophila stolonifera (Blanco) Merr., Monarda austromontana Epl., Ocimum basilicum L., Origanum vulgare L., O. majorana L., Poliomintha longiflora Gray, and Salvia sp. The name "poleo" is applied also to L. alba (Mill.) N. E. Br., L. grisebachiana Moldenke, L. integrifolia (Griseb.) Hieron., L. turbinata Griseb. and its varieties, and Mentha pulegina L.

The Lippia affinis of Briquet is a synonym of Aloysia sellowii (Briq.) Moldenke. The Kuntze s.n. [Velasco, 200 m., VII.92], cited hereinafter under L. salviaefolia Cham., may prove to represent L. affinis instead.

Material of L. affinis has been misidentified and distributed in herbaria under the names L. berterii Spreng. and L. graveolens H.B.K. On the other hand, the Curran & Haman 606, 966, & 1150a, Garcia Barriga 4875, Lehmann B.T. 818 (in part), H. Pittier 8096, 8251, 9671, & 10542, Saer 62, H. H. Smith 587, and Tamayo 326 & 976, distributed as L. affinis, are all L. origanoides H.B.K.

In all, 21 herbarium specimens of L. affinis have been examined by me.

Citations: BRAZIL: Minas Gerais: Black & Mendes Magalhães 51-11776 (Be--69604); F. C. Hoehne s.n. (N, N, Sp, Sp--5217); Mendes

Magalhães 2507 [Herb. Jard. Bot. Belo Horiz. 43709] (N); Mexia 5625 (Gg, Go, N, N, S); Sampaio 6829 [Herb. Jard. Bot. Belo Horiz. 12307] (N); L. B. Smith 7069 (N, Z); Williams & Assis 5809 (G, N). São Paulo: Viegas & Viegas s.n. [Herb. Inst. Agron. Est. S. Paulo 3980] (W--1775602). BOLIVIA: Santa Cruz: Kuntze s.n. [Sta. Cruz, 1000 m., V.92] (N, W--701990), s.n. [Sierra, 2000 m., 5.1892] (N). LOCALITY OF COLLECTION UNDETERMINED: Herb. Martius 12008 (Br).

LIPPIA ALBA (Mill.) N. E. Br. ex Britton & Wils., Scient. Surv. Porto Rico 6: 141. 1925.

Synonymy: Nepeta maxima flore albo, spica habitiori Sloane, Cat. Pl. Ins. Jamaic. 1: 65. 1696. Lantana alba Mill., Gard. Dict., ed. 8, Lippia no. 8. 1768. Verbena globiflora L'Hér., Stirp. Nov. 1: 22—23, pl. 12. 1786. Zappania odoratissima Scop., Delic. Fl. & Faun. Insub. 1: 34--35, pl. 15. 1786. Zapania lantanoides Lam., Tabl. Encycl. Méth. Bot. 1: 58. 1791. Zapania globiflora (L'Hér.) Willd., Sp. Pl. 1: 116. 1797. Lippia asperifolia A. Rich. ex Marthe, Cat. Pl. Jard. Méd. Paris 67. 1801 [not L. asperifolia Benth., 1947, nor Hochst., 1947, nor Reichenb., 1828, nor L. C. Rich., 1906]. Verbena globifera L'Hér. ex A. Rich. in Marthe, Cat. Fl. Jard. Méd. Paris 67, in syn. 1801. Zapania globiflora A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 72. 1806. Zapania odorata Pers., Syn. Pl. 2: 140. 1806. Lippia geminata H.B.K., Nov. Gen. & Sp. Pl. 2: 266. 1818 [not L. geminata Millsp., 1930, nor Schl., 1964]. Verbena odorata Pers. ex Steud., Nom. Bot., ed. 1, 873 & 898. 1821 [not V. odorata Desf., 1841, nor Meyen, 1834, nor Meyer, 1946]. Zapania odoratissima Scop. apud Steud., Nom. Bot., ed. 1, 898, in syn. 1821. Lantana geminata (H.B.K.) Spreng. in L., Syst. Veg., ed. 16, 2: 763. 1825. Verbena lantanoides Willd. ex Spreng. in L., Syst. Veg., ed. 16, 2: 763, in syn. 1825. Lippia geminata Kunth apud Spreng. in L., Syst. Veg., ed. 16, 2: 763, in syn. 1825; Schau. in A. DC., Prodr. 11: 582. 1847. Verbena globulifera L'Hér. apud Spreng. in L., Syst. Veg., ed. 16, 2: 751, in syn. 1825. Lantana mollissima Desf., Cat. Hort. Par., ed. 3, 393. 1829. Lippia citrata Willd. ex Cham., Linnaea 7: 215, in syn. 1832. Lippia asperifolia Poepp. ex Cham., Linnaea 7: 215, in syn. 1832. Lantana odorata Weigelt ex Cham., Linnaea 7:215, in syn. 1832 [not L. odorata Ait., 1847, nor L., 1767]. Lippia citrata Cham., Linnaea 7: 214. 1832. Lantana lippioides Hook. & Arn., Bot. Beech. Voy. 305. 1837. Lantana geminata Spreng. apud Steud., Nom. Bot., ed. 2, 2: 8. 1841. Verbena globulifera Auct. ex Steud., Nom. Bot., ed. 2, 2: 54 & 750, in syn. 1841. Lippia geminata Humb. & Bompl. ex Steud., Nom. Bot., ed. 2, 2: 54, in syn. 1841. Zappania odorata Pers. ex Steud., Nom. Bot., ed. 2, 2: 797, in syn. 1841. Zappania lantanoides Lam.

ex Steud., Nom. Bot., ed. 2, 2: 797. 1841. Lantana cuneatifolia Klotzsch ex Walp., Repert. Bot. Syst. 4: 45, in syn. 1845. Nepeta maxima flore albo, spica habiliori Sloane ex Walp., Repert. Bot. Syst. 4: 47, in syn. 1845. Lippia geminata Humb. & Kunth ex Benth., Bot. Voy. Sulphur 153. 1846. Lantana geminata Spreng. ex Morren, Belg. Hort. 1: 134, in syn. 1851. Verbena lantanoïdes Auct. ex Morren, Belg. Hort. 1: 134, in syn. 1851. Lantana lippioïdes Hook. & Arn. ex Morren, Belg. Hort. 1: 134, in syn. 1851. Zapania globiflora Poir. apud Schau. in Mart., Fl. Bras. 9: 236, in syn. 1851. Lippia geminata var. microphylla Griseb., Abhand. Königl. Gesell. Wissen. Götting. 7: 255. 1857. Lippia panamensis Turcz., Bull. Soc. Nat. Mosc. 36 (2): 201. 1863. Lippia havannensis Turcz., Bull. Soc. Nat. Mosc. 36 (2): 202. 1863. Lippia asperifolia H.B.K. ex Bocq., Adansonia 3: 244. 1863. Zapania geminata (H.B.K.) Gibert, Enum. Pl. Montev. 44. 1873. Lippia lantanoides Coult., Contrib. U. S. Nat. Herb. 2: 328--329. 1892. Lippia crenata Sessé & Moc., Fl. Mex., ed. 2, 140. 1894 [not L. crenata (Griseb.) Kuntze, 1898, nor Kuntze, 1904, nor Pearson, 1959]. Lippia havanensis Turcz. apud Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894. Lippia globiflora (L'Hér.) Kuntze, Rev. Gen. Pl. 3 (2): 251. 1898. Lippia globiflora albiflora Kuntze, Rev. Gen. Pl. 3 (2): 252, nom. nud. 1898. Lippia globiflora f. pubescens Kuntze, Rev. Gen. Pl. 3 (2): 252, nom. nud. 1898. Lippia globiflora α normalis Kuntze, Rev. Gen. Pl. 3 (2): 251. 1898. Lippia globiflora α normalis f. lilacina Kuntze, Rev. Gen. Pl. 3 (2): 251. 1898. Lippia globiflora β geminata (H.B.K.) Kuntze, Rev. Gen. Pl. 3 (2): 251--252. 1898. Lippia globiflora β geminata f. glabriuscula Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898. Lippia globiflora δ microphylla Griseb. ex Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898. Lippia globiflora δ microphylla f. glabriuscula Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898. Zapania lantanodes Lam. ex Kuntze, Rev. Gen. Pl. 3 (2): 251, in syn. 1898. Lippia globiflora Kuntze apud Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106, in syn. 1904. Lippia globiflora var. normalis Kuntze apud Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 315. 1904. Verbena globulifera Spreng. apud H. J. Lam, Verbenac. Malay. Arch. 369, in syn. 1919. Lippia globiflora var. geminata (Kunth) Kuntze apud Seckt, Rev. Univ. Nac. Cordoba 17: 89. 1930. Lippia lantanoides (Lam.) Herter, Revist. Sudam. Bot. 4: 185. 1937. Zapania globiflora (L'Hér.) Willd., Poir., & Juss. ex Moldenke, Lilloa 4: 294, in syn. 1939. Zapania globiflora (L'Hér.) Juss. ex Moldenke, Prelim. Alph. List Invalid Names 54, in syn. 1940. Zapania globiflora (L'Hér.) Poir. ex Moldenke, Prelim. Alph. List Invalid Names 54, in syn. 1940. Lippia

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Illustrations: Sloane, Voy. Jam. 1: pl. 108, fig. 1. 1707; Nair & Rehman, Bull. Nat. Bot. Gard. Lucknow 76: 9, pl. 1, fig. 3, text-fig. 13--16. 1962.

An erect perennial herb or straggly, aromatic, densely puberulent, low, coarse, erect shrub or subshrub, to 2 m. tall, with a strong lemon (Citrus limonia), lime (C. aurantifolia), mint (Mentha) or sage (Salvia) odor, sometimes scrambling, procumbent or semi-procumbent, or more or less decumbent, rarely creeping or scandent, usually much branched from the base and with long rooting suckers there; stems many, to 1.5 cm. in diameter, rooting at the nodes; branches elongate, slender, ascending or pendulous, sometimes arching, trailing, or prostrate; leaves decussate-opposite or ternate, thickish, very aromatic-fragrant; petioles slender, 3--8 mm. long, cinereous-pubescent; leaf-blades ovate or oblong, 2--7 cm. long, usually 1.2--2.3 cm. wide, dark-green above, acute or obtuse at the apex, conspicuously serrate or serrulate to crenate along the margins (except at the very base), mostly cuneate or narrowed into the petiole at the base, strigose-hirtellous or puberulent and more or less rugose (when mature) above, densely short-pubescent or soft-velvety to tomentose beneath with cinereous hairs; inflorescence axillary, capitate, usually much shorter than the subtending leaves or only subequaling the petiole, solitary or rarely paired in all the upper leaf-axils; peduncles slender, mostly solitary in the leaf-axils and 2 per node; heads globose or subglobose to shortly oblong, 8--12 mm. long, about 8 mm. wide; bractlets ovate, 3--5 mm. long, acute at the apex, the lowermost 3--3.5 mm. wide, nearly as long as the corolla, not accrescent; flowers fragrant or non-odorous; calyx 2-toothed; corolla hypocrateriform, varying from pinkish-blue, light violet-blue, pink, light-pink, pinkish, rose, pale-rose, or lilac-rose to light-lilac, lilac, pale-lilac, rose-lilac, purple-lilac, light-purple, pale-purple, pink-purple, purple, violet-purple, and even violet, pale reddish-violet, lavender, mauve, or white, often white or yellowish to yellow on the inner surface, its tube 4--5 mm. long, about 3 times as long as the calyx; pollen-grains prolate spheroidal, 32 x 30 $\mu$, the ectocolpium narrow and faint, the endocolpium clear, lalongate, 3.5 x 19.2 $\mu$, the lateral ends pointed, the exine 2.8 $\mu$ thick, the ectine surface

granulate; chromosomes small, their number: 2n = 40 (42?).

The type of this common and widely distributed, apparently very variable species was collected by William Houstoun in Campeche, Mexico, and is deposited in the Philip Miller Herbarium at the British Museum (Natural History) in London. It is represented by the L. H. Bailey Hortorium negative 5057. N. E. Brown says that the Columbia University Herbarium specimen of Pringle 1960 is an exact match for Houstoun's specimen, except that the leaves are rather more deeply toothed in Houstoun's plant.

The species is widely distributed through the West Indies, Mexico, Central America, and tropical and subtropical South America south to Argentina; introduced and often escaped from cultivation elsewhere. The specific epithet is sometimes uppercased for no valid reason. The plant belongs in the Section Zapania, Subsection Axilliflorae.

The so-called type of Lippia asperifolia A. Rich. was collected from a cultivated plant in the Jardin des Plantes in Paris, a duplicate being deposited in the DeCandolle Herbarium at Geneva, but this name is actually a nomen illegitimum based on Verbena globiflora L'Hér. The type of Lippia asperifolia Poepp. was collected by Edouard Friedrich Poeppig somewhere in Cuba. The name Lippia asperifolia H.B.K. is based on a Bonpland collection from Cumana, Venezuela, deposited in the Bonpland Herbarium at the Muséum National d'Histoire Naturelle at Paris, but H.B.K. (1818) plainly say "Lippia asperifolia Rich." on page 265 of their work, giving as synonyms Zapania lantahoides Lam., Z. odorata Pers., and Verbena globiflora L'Hér. The type of Verbena lantanoides Willd. is Herb. Willdenow 11124, deposited in the herbarium of the Botanisches Museum at Berlin; that of Verbena globiflora L'Hér. is a specimen collected by Alexander Cruckshanks at Lima, Peru. The type of Lippia balsamea was collected by Joannesa de Santa Barbara in Rio Grande do Sul, Brazil, in 1836, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels; that of L. citrata is Sieber s.n. from Pará, Brazil, sent by Graf Johann Centurius von Hoffmannsegg in 1830, deposited in the same herbarium; that of L. citrata var. triphylla was gathered by August Kappler (no. 1860) from cultivated plants in Surinam and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm; that of Lantana mollissima is a specimen cultivated in the Jardin des Plantes and deposited in the Paris herbarium, a duplicate collected in 1825 deposited in the DeCandolle Herbarium at Geneva. The type of L. havanensis was collected by Jean Jules Linden (no. 72 bis) in the province of Havana, Cuba

The type of Lippia geminata is a collection made by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland at Rio Apure, Venezuela, deposited in the Bonpland Herbarium at Paris and there photographed by Macbride under his type photograph no. 39485; that of L. geminata var. microphylla was gathered by

Edouard Placide Duchassaing de Fontbressin on the island of Guadeloupe and is said to have been a shrub 1--2 feet tall, with small leaves 1.6 cm. long and 8 mm. wide, subequaling the peduncles, and violet-purple corollas. Lantana trifolia Sw. is based on Duss 4552, cultivated on Guadeloupe island and deposited in the Britton Herbarium at the New York Botanical Garden; Lippia glabriflora is based on Hassler 11112 in the United States National Herbarium.

The type of Lippia crenata was collected by Martin Sessé y Lacasta, José Mariano Mocino, Juan Diego del Castillo, and José Maldonado (no. 2215) somewhere in Mexico, deposited at Madrid; that of L. panamensis is Fendler 220 from Chagres, Panama, deposited at Leningrad; and that of Leonotis myrtifolia was collected by Charles Wright (no. 3157) in Cuba, deposited at Stockholm. Lorentz & Hieronymus 1174 is a cotype collection of L. globiflora β geminata f. glabriuscula, while L. globiflora α normalis f. lilacina is based on Otto Kuntze collections from (a) Concepcion, northern Paraguay, and (b) Matto Grosso, Brazil, July 1892, deposited in the Britton Herbarium.

It is worth noting here that the Lippia asperifolia of L. C. Richard, referred to in the synonymy above, belongs in the synonymy of L. javanica (Burm. f.) Spreng., that of Hochstetter belongs to L. baumii Gürke, and that of Bentham and of Reichenbach belong to Phyla scaberrima (A. L. Juss.) Moldenke; the Lantana trifolia of Aiton, of Chamisso, and of H.B.K. belong in the synonymy of L. trifolia L., that of Briquet belongs to L. micrantha Briq., that of A. Chevalier belongs to L. mearnsii Moldenke, and that of Sessé & Mocino belongs to L. hispida H.B.K. Lippia geminata Schl. is a synonym of L. graveolens H.B.K., while L. geminata Millsp. is Lantana microcephala A. Rich. The L. crenata of (Griseb.) Kuntze and of Kuntze are L. junelliana (Moldenke) Troncoso, while that of Pearson is L. pretoriensis H. H. W. Pearson.

Baker (1883) states that his Lippia oligophylla is "allied to L. sessiliflora and L. geminata", but actually it is not even verbenaceous -- it is Acrocephalus villosus Benth. in the Lamiaceae.

Zapania scaberrima Pers. is included in the synonymy of what we now call Lippia alba by Sprengel (1825), Lippia dulcis Trev. is included by Steudel (1841), and Lantana lavandulacea is included by Schauer (1851) and others, but all of these binomials belong instead in the synonymy of Phyla scaberrima (A. L. Juss.) Moldenke. Pittier (1939) reduces Lippia origanoides H.B.K. to synonymy under our plant, but it is a separate and distinct species. Boissier (1879) placed Lantana indica Roxb., L. dubia Royle, and L. collina Decne. in the synonymy of what he called Lantana alba Mill., but in my estimation Lantana indica is a distinct and valid species, with L. collina as a synonym, while L. dubia is a synonym of L. trifolia L.

The Lantana inermis, foliis oppositis, ovatis dentatis, floribus capitato-umbellatis, folioso-involucratis J. Burm. in Plum., Pl. Amer. 60 (1755) and Lantana inermis, foliis obpositis, ovatis J. Burm. in Plum., Pl. Amer. pl. 71, fig. 2 (1755) are sometimes cited as belonging to Lippia alba, but I regard them as belonging to the synonymy of Lantana jamaicensis Britton instead.

Verbena capensis Thunb., Lippia capensis (L.) Spreng., L. capensis Spreng., L. capensis (Thunb.) Spreng., and L. scabra Hochst. are often given in the synonymy of L. alba by various authors, but belong definitely in the synonymy of L. javanica (Burm. f.) Spreng., being based on African material.

What is currently being called Lippia alba is apparently a very polymorphic taxon. Possibly it should be divided into two species or varieties, typified by the L. geminata H.B.K. and the L. globiflora (L'Hér.) Kuntze forms. If these were to be kept separate, then the name Lippia lantanoides Coult. would certainly belong in the synonymy of the former for which it was only a new name when published, while Zapania lantanoides Lam. would go to the synonymy of the latter for which it was also merely a new name when published. Schauer (1851) actually keeps the two apart and assigns to each the following synonymy: (1) L. geminata H.B.K. -- including Lantana lippioides Hook. & Arn., L. mollissima Desf., L. odorata Weigelt, Lippia asperifolia Poepp., L. citrata Cham., and Verbena lantanoides Willd. (2) L. asperifolia A. Rich. -- including Lantana lavandulacea Willd., Lippia capensis Spreng., L. scabra Hochst., Verbena globiflora L'Hér., Zapania globiflora Poir., Z. lantanoides Lam., Z. odorata Pers., and Z. odoratissima Scop. He says of L. geminata: "Planta habitu semper insignis, neque cum ulla alia confundenda. L. citrata et L. geminata omnino non differunt. Capitula plerumque solitaria, interdum, et quidem in una eadamque stirpe, geminata. Itaque nomen Kunthianum, minus quidem aptum sed antiquis restituendum videbatur. -- A L. asperifolia Rich. abhorret; toto habitu, foliis supra minime strigoso-scaberrimis sed mollibus et aetate demum scabridis, praecipue vero capitulis brevipedunculatis omnino alienis." For L. asperifolia his comments are "Rigoroso examine discrimen inter plantam Americanam et Africanam allud detegere non contigit, nisi quod in Africana bracteae essent magis acuminatae, flores paullo majores." Morren (1851) also keeps the two separate.

Briquet (1904) says [p. 251] "Nous partageons entièrement l'opinion de M. O. Kuntze que la distinction des L. geminata et L. asperifolia, telle que Schauer l'a admise dans le Prodromus....ne peut être maintenue. C'est avec raison que l'auteur a rétabli pour l'espèce collective la dénomination princeps [L. globiflora], conformément aux lois de la Nomencl. art. 57." Kuntze (1898), however, says "L. globiflora OK. (Verbena gl. L'Her. 1784 = Zapania odoratissima Scop. 1786 = Zap. lantanodes Lam. 1791 = Lippia asperifolia

Rich. 18.. = L. geminata HBK. 1817) α normalis O. Ktze. Frutex pubescens minus ramosus foliis majoribus (--8 cm longis, --5 cm latis) pedunculis plerumque solitariis; f. lilacina O. Ktze. Mattogrosso. Paraguay. Hierzu auch L. citrata Cham. β geminata O. Ktze. (HBK.) Frutex ramosior foliis duplo minoribus [p. 252] pedunculis saepius geminatis floribus albis vel lilacinis; f. glabriuscula O. Ktze. Caulibus foliisque glabriusculis. Argentina: Salta, Tucuman (L. & H.). γ lanceolata Gris. Foliis angustis (1: 4--6). f. incana O. Ktze. Folia utrinque incana. Argentina: Oran (Hieronymus). ε microphylla Gris. Folia minima 1--1 1/2 cm longa 5--8 mm lata. f. glabriuscula O. Ktze. Argentina: Catamarca (Lorentz & Hieronymus). Ich kann Lippia asperifolia, für die der ältere Name globiflora einzutreten hat, nicht von L. geminata unterscheiden; weder die Blüthenfarbe (albiflora, lilacina) noch die Behaarung (f. pubescens, glabriuscula, incana) dieser weitverbreiteten Art, noch der Habitus bietet einem Anhalt dazu. Je grösser, robuster und verzweigter der Strauch wird, um so kleiner pflegen die Blätter zu sein. Die grösstblättrigen Formen wachsen an Flussufern und feuchten Stellen, zeigen aber geringe Verzweigung (jüngere Exemplare?)."

Mocquerys 851 was determined by Troncoso as "Lippia alba (Mill.) N. E. Br. var.", apparently indicating an opinion that it does not represent the typical form of the species and deserves nomenclatural recognition. A notation on Hering s.n. in the Leiden herbarium says "Lantana canescens Kunth Spr. 2: 763; Lantana mollissima, breve pedunculata; affinis iconi Burm. Amer. tab. 71, f. 2, sed differt pedunculis petiolo aequalibus, nec longioribus."

The "Lippia asperifolia L. C. Rich." of Pulle, Enum. Pl. Surinam. 401 (1906) appears to be an error for L. asperifolia A. Rich.; the "Lantana sp.?" of Sessé & Mocino, based on their no. 2195, is plainly Lippia alba, but the "Lippia alba" cited by Lundell (1937) is Lippia graveolens H.B.K.

Lippia alba has been collected in woods, oak and secondary forests, chaparral, thickets, clearings and occupied clearings, marshes and swamps, sandy or swampy places in general, low ground and lagoons, fields and sunny or moist fields, hedgerows, open or waste places,wet or sandy campos, moist ground near riverbanks, moist meadows near the edges of lakes, and Hevea brasiliensis nurseries, along roadsides and highways, trails, old canals and streamsides, at the edge of woods and the margins of primeval woods, at the edge of and in palm hammocks, among shrubs on sandy riverbanks, on dunes and high sand bars, on shores and sandy shores, beaches and llanos, barrancas and dry barrancas, grassy stream barrancas, wooded river edges, riverbanks, and river ledges, sandy seashores, savannas and wastelands, stony banks and saline plains, rocky barrancas and very dry savannas, as well as on road shoulders in the full open sun, at altitudes from sea-level to 2500 meters. It has been found growing in clay or wet alluvial clay soil, clay-

loam or moist loam, dry or dry sandy soil, dry exposed soil, deep loose or wet sand, dry alluvial gravel, and dry periodically inundated soil, blooming in every month of the year and fruiting from February to December.

Box, in his manuscript Flora of Antigua, says "Known to me by a few plants growing by an old estate pond at Coconut Hill, in the driest part of the limestone region. Evidently very rare and local." Schipp describes the species as a rare shrub in secondary forests in British Honduras, growing to 4 feet in height, with a stem diameter of half an inch, pendulous branches, and heliotrope-colored flowers. Standley (1938) reports it from "Thickets of the Pacific tierra caliente, ascending to the region of San José; Guanacaste; sometimes cultivated, probably for medicinal purposes. Widely distributed in tropical America.....The plant finds various uses in domestic medicine" in Costa Rica. Pittier refers to it as "gregarious on river flats" in Venezuela. Runyon says of it "frequent in semi-moist situations, sand-loam" in Texas and "occasional on the banks of the Rio Grande and the resacas." Cory reports it "infrequent on banks of river" in the same state. T. Meyer found it frequent on the high campos in the Chaco.

Parodi (1934) says "Arbusto de hojas caducas, originario del Brasil, Uruguay, Paraguay y Noreste argentino hasta la región platense. Se lo cultiva para adorno, propagándose muy fácilmente por estacas y división de matas." Rosengurtt (1949) describes it as "sufrútice recostada entre arbustos de bosques ribereños; poco frecuente" in Uruguay. In Cuba it is described by Roig y Mesa (1945) "Es una mata no muy común que se le encuentra principalmente cultivada en patios y jardines. Crece además en las otras Antillas Mayores, en algunas de las Antillas Menores, en las Bahamas y en la América tropical continental."

In Texas it is said to grow in woods and semi-moist situations on the banks of rivers and resacas, blooming from March to October, on the Rio Grande plains and coastal prairies of the southern part of the state from Zapata to Cameron and northeast to Wharton Counties. It has been widely confused there with the Florida and West Indian Lantana involucrata L., which is not known from Texas. Small (1933) and Cory (1937) record Lantana involucrata from the state, probably on the basis of these misidentifications.

Pedersen says of it "fairly common in sunny pastures, seems to prefer sandy soil with subsoil of 'greda'.....common in deep loose sand" in Corrientes, Argentina. Standley & Padilla found it to be "common" in El Salvador; King avers it to be locally abundant in Tamaulipas. Lombardo (1954) states "Se le encuentra en algunos alambrados y tejidos viviendo en estado espontáneo y subespontáneo" in Montevideo. The Brittons found it "established after cultivation" on the island of Trinidad. Duss says "planted about all the houses [on Martinique] and common in gardens." León reports that it is "usually in gardens [in Cuba], may be introduced." Le Cointe (1934, 1947) speaks of a Lippia species commonly cultivated in the city of São Paulo -- this probably is L. alba. Pittier states that the plant is "pigly aromatic", but exactly what he means by this is

not clear since all other authors describe the odor of the plant as quite pleasant. Nair & Rehman (1962) give palynograms of the species and cite their slide no. 309, not seen by me.

It should be pointed out here that the very large-leaved type of this species is well represented by Cory 28309; the almost glabrous-leaved form by Poeppig 2614; the heavy "globiflora" form by Arechavaleta s.n. [Pocitos, Buceo, & vic. of Montevideo], Herb. Osten 3753, Montes 990 [which certainly looks as though it is a distinct taxon!], H. H. Rusby 704, Sellow s.n. [Brasilia], and O. E. White 905; the long-acuminate bractlet type by Buchtien 1458, Dusén 14170, Kuntze s.n. [VII.92], and Miers 1206; and the small-leaved northern form by Herb. Osten 16469 & 17309 and Schröder s. n. [Colonia, Jan. 30, 1922] & s.n. [Paysandú, Dec. 1924]. Herter 747, Herb. Herter 82833, and Pflanz 2093 are anomalous.

In the event that horticulturists should eventually wish to separate color forms of this species, the following specimens are described by their respective collectors as having had corollas of the following colors: "blue" — Soeprato 138, Tresling 156; "white, blue, and yellow" — Dodson & Thien 1281; "mauve" — Britton, Britton, & Brown 6070; "heliotrope" — Schipp 755; "violet" — Ferreyra 10113, R. E. Fries 1425, Fuertes 586, Lemoine 7844, Malme 768 & 2787, Pittier 13118; "light-violet" — Lanjouw 8, Versteeg 64; "light-violet with yellow throat" — Asplund 17605; "violet-purple" — Grisebach; "pale-purple" — Herb. Herter 82833, Herter 747; "light-purple" — Pedersen 1906, G. R. Proctor 9421; "purple" — Dodson & Thien 1260, Hinton 14024, T. Meyer 135, Raimondi 750, R. Runyon 898 & 2177, Standley & Padilla V.3230, Wonderly 52; "pink-purple" — Leonard & Leonard 15470, R. Runyon 2603; "light-pink" — Herzog 1429; "pinkish" — S. S. White 5679; "pink, yellow or yellowish within" — Rojas 1406 & 8326; "pinkish-blue" — Shafer 2428; "pink" — Correll & Johnston 17926, Correll & Robbins 20956, R. S. Ferris 5927, Hinton 5720, 12844, 13149, 13585, & 13962, A. S. Hitchcock 20206, Howard 5471, Kappler 1860, Mexia 819, F. W. Pennell 4143, Ruiz Leal 14266, J. V. Santos 2533; "rose" — W. E. Broadway 99, Hassler 7367 & 7397, Herb. Osten 13562 & 20678, Jörgensen 2471, Koelz 22492, Macedo 3280, T. Rojas 1874, 1875, 12212, & s.n. [Concepcion, Dec. 1916], Rosengurtt B.4232, Ruiz Huidobro 2037, 2180, 3078, 3116, 3309, 3343, 3879, & 3888, Sagot 469, Schreiter s.n. [Embarcacion, Dec. 20, 1925], Wroth 59; "pale-rose" — Jörgensen 2471; "lilac-rose" — Rodrigo 952; "rose-lilac" — T. Rojas 12082; "rose, yellow inside" — Herb. Hicken 242, Herb. Osten 7534, T. Rojas 406, 495, 1874a, & s.n. [San Bernardino, June 1915]; "pale reddish-violet" — Ekman H.3514; "lilac" — Bailey & Bailey 1236, Britton, Britton, & Wilson 5492, W. Harris 11911, R. A. Howard 4855, Klug 1637, Macedo 2612, T. Meyer 10058, 10099, &

10404, Mexia 1929, Steyermark 35447; "light-lilac" -- Asplund 14375; "pale-lilac" -- Steyermark 50859; "purple-lilac, white inside, later yellow" -- Herb. Osten 19033, Herter s.n. [Nueva Palmira, April 1926]; "lavender" -- W. E. Broadway 346, Correll & Schweinfurth 15661, W. H. Cowgill 2073, Eyerdam & Beetle 22993, R. A. Howard 11718, R. M. King 4035, Koelz 2168, E. C. Leonard 8515, Leavenworth 200, Lundell & Lundell 8685, Plant Quarant. 050726, Trin. Bot. Gard. Herb. 8199; "lavender with a yellow eye" -- C. L. Lundell 10644; "lavender and white" -- Gilly & Hernandez Xolocotzi 253; "tube lavender, large lip purple, throat orange" -- Feddema 578; and "white" [perhaps worthy of a form name] -- Angulo 1325, Barbosa da Silva 2, W. Harris 11737, Irwin R.120, Maxon & Killip 1636, Raimondi 10576. It must always be remembered, however, in most cases where color variation is given on the basis of various collectors' reports, many of these apparent variations may be due only to differences in interpretation of the same color by different collectors or even to defects or imperfections in their color-vision.

Common and vernacular names for this plant are very numerous, including "ajeujo cimarron", "alfombrilla", "alfrombrilla", "alfronbrilla", "anís de España", "anís del España", "beukes bosjie", "blakka tiki ment", "bushy lippia", "cariaquito", "cedrilha", "cidra", "cidraero", "cidreira", "cidrera", "cidrilha", "cidrilhi", "cidrilla", "erva cidreira", "erva cidreira do campo", "frutilla de perro", "graveelkruidje", "herva cidreira", "herva cidreira do campo", "herva-cidreira do campo", "hierba buena", "hierba del negro", "hierba negra", "hinojo de anís", "juanilama", "leppie rude", "lippie rude", "malmequer do mato", "malva", "malva thee", "mastranso", "mastranto", "mastranza", "melissa", "menta americana", "mint", "mirto", "murtinha italiana", "oregano", "orégano", "orégano de burro", "orozuz de la tierra", "palisado", "pampa oregano", "pampa orégano", "pamporegano", "pan poregano", "piépié pau", "poleo", "poley", "prontopalivio", "quita dolor", "quitadolor", "romero", "round-headed vervain", "Saint Mario", "salsa limão", "salva", "salva do Brasil", "salvia", "salvia americana", "salvia betónica", "salvia colorado", "salvia comun", "salvia del Brasil", "salvia-limão", "salvia morada", "salvia trepadora", "Santa Maria", "sauce limón", "sauge", "sauge du Brésil", "sideraea", "sidraera", "sidreira", "solvale thee", "sonora", "sonora lila", "St. Mario", "tarete", "te", "te castillans", "té de Castilla", "té de Castillo", "té del pais", "te del país", "te de playa", "toronjil", "toronjil americano", "toronjil de España", "toronjil isleño", "toronjil mentol", "wild mint", "yerba buena americana", "yerbabuena arómatica matorral flor morada", "yerba buena cimarona", "yerbabuena cimarrona", "yerba cidreira", "yerba cidrera", and "yuanilama". The name "poleo" is also applied to L. affinis Schau., L. grisebachiana Moldenke, L. integrifolia (Griseb.) Hieron., L. turbinata Griseb. and its varieties, and Mentha pulegium L., while "romero" is ap-

plied also to Baccharis rosmarinifolia Hook. & Arn. and to Senecio rosmarinus Phil.

Johnson reports that L. alba is an aromatic sudorific used by the natives of Campeche in an infusion called a tea, "palisado", by them; Hinton reports that a brew is made from the very fragrant leaves in Mexico and used to treat stomache-ache. Asenjo 30 was actually purchased on the drug market in Puerto Rico. Hocking (1955) refers to the species as a diaphoretic, antispasmodic, emmenagogue, and stomachic. Biolley refers to it as a "medicinal plant" in Costa Rica, while Steyermark says that it is reported to be effective in the treatment of coughs in Guatemala. On the island of Martinique it is "used as a pectoral and sudorific" according to Duss. Its leaves are used for tea in Colombia, according to Proctor. Lados says of it "planta aromatica, estomacal, emenagoga, e anti-espasmodica" in Brazil, and Le Cointe (1945) makes the identical statement, adding "pectoral". Henz also refers to it as "medicinal" in Brazil, while Barbosa da Silva reports that a tea of the leaves is taken in the same country to counteract the effects of purgatives. It is "medicinal" in Argentina, according to Wroth & Morel. In Surinam, according to Lanjouw, the herbage is used for bathing in the treatment of fevers.

Roig (1945) says "En Camagüey la llaman Quita dolor y la toman en cocimiento contra los dolores de estómago. Con el mismo fin lo venden en el mercado de Santiago de Cuba con el nombre de Menta americana. En San Antonio de los Baños lo llaman Hinojo de anís y lo usan en infusión contra los cólicos hepáticos. En otros lugares de la provincia de la Habana la llaman poleo y la usan como pectoral. En Puerto Rico también la llaman Poleo. Según Standley la planta tiene propiedades sudoríficas, anti-espasmódicas, estomáquica y emenagoga. La infusión alcohólica se aplica en fricciones contra los resfriados. Grosourdy con el nombre Salvia del Brasil, dice que esta planta tiene las propiedades estimulantes de la Salvia de Europa y se usa en los mismos casos a la dosis de un manojo de la planta en una botella de agua hirviendo; tomando por tazas la infusión endulzada en el término del día." In his 1949 work he says that it is used as an antidysenteric in Cuba and South America; in his 1953 work he comments "usada como medicinal. En la parte Sur de Camagüey se le encuentra en antiguos bateyes. Su cocimiento se usa contra los dolores de estómaga."

It should be mentioned here that the illustration labeled "Lippia asperifolia" by Briquet in Engler & Prantl, Nat. Pflanzenfam. 4 (3a): 150, fig. 58 C & D (1895) appears to represent L. javanica. The H.B.K., Nov. Gen. & Sp. Pl. 2: 266 (1818) reference cited in the bibliography above is often misdated "1817"; the reference "Humb. & Kunth, Nov. Gen. 2: 214" occurring in literature has not been located by me, nor have I been able to trace "Lam. Ill. 2: 140"; L'Hér., Stirp. Nov. 1: 23, pl. 12 (1786) is often misdated "1784" or "1785"; Marthe, Cat. Pl. Jard. Méd. Paris 67

(1801) is often referred to as "Rich. Cat. Hort. Med. Paris 67"; Coult., Contrib. U. S. Nat. Herb. 2: 328--329 (1892) is sometimes erroneously cited as "1891" or "1894"; Ragonese, Darwiniana 5: 413 (1941) is sometimes referred to as "Ragonese, Santa Fe 413"; Lorentz, Veg. Nordeste Prov. Entre Ríos" is often cited as "Lorentz, Entre Rios"; T. Herzog, Meded. Rijksherb. Leiden 29: 44 (1916) is often cited as "Herzog, Bolivia III (1916) 44"; Gleason, Bull. Torrey Bot. Club 58: 463 (1931) is sometimes referred to as "Gleason, Tyler-Duida (1931) 463"; Hook., Bot. Misc. 1: 171--172 (1829) is often misdated "1830"; and the J. K. Small, Fl. Southeast. U. S., ed. 1, 1012 (1903) and ed. 2, 1012 (1913) references are often incorrectly cited as page "1014".

Material of Lippia alba has been misidentified and distributed in herbaria by various workers under the names Aloisia citriodora Ort., Aloisia sp., Goniostachyum graveolens (H.B.K.) Small, Lantana canescens Kunth, L. canescens H.B.K., L. chamissonis D. Dietr., L. citrosa (Small) Moldenke, L. indica Roxb., L. involucrata L., L. lilacina Desf., L. odorata L., L. odorata Sessé & Moc., L. origanoides H.B.K., L. originoides H.B.K., L. recta Ait., L. reticulata Pers., L. sellowiana Link & Otto, L. trifolia L., L. velutina Mart. & Gal., Lantana sp., Lippia balansae Briq., L. berlandieri Schau., L. javanica Spreng., L. origanoides H.B.K., L. stoechadifolia Kunth, L. wrightii A. Gray, Verbena sp., and even Bacopa aquatica Aubl., Hyptis stricta Hoffmgg., Mikania hasslerana f. cuneifolia Hassler, and Waltheria americana L.

On the other hand, the Weberbauer 6346, distributed as this species, is actually L. americana f. hyptoides (Benth.) Moldenke; Venturi 36 is L. asperrima Cham.; C. F. Baker 206 & 660, Brenes 17509, and Garnier 264 & 601 are L. cardiostegia Benth.; R. E. Fries 1445 is the type collection of L. chacensis Moldenke; Aguilar Hidalgo 40, M. E. Jones 29186, Millspaugh 41, Parks & Cory 19425, Small & Wherry 11921, Tharp 5904, and Vogd s.n. [Pharr, June 18, 1947] are L. graveolens H.B.K.; Tamayo 326 is L. origanoides H.B.K.; M. E. Jones 23231 is L. palmeri S. Wats.; Archer 4667, Herb. Inst. Miguel Lillo 32056, Pedersen 1163, and Rodriguez 234 are L. recolletae Morong; Venturi 354 & 1789 are L. suffruticosa (Griseb.) Kuntze; Lorentz & Hieronymus 236 & 373, Jörgensen 1024, and Werdermann 474 are L. turbinata Griseb.; Bailetti 37 and Herb. Inst. Miguel Lillo 32219 are Lantana aristata var. angustifolia (Kuntze) Moldenke; Archer 227 and Pittier 1289 are L. boyacana Moldenke; Killip & Smith 16399, Miller & Johnston 94, Pittier 7029, 10285, & 11061, E. Reed 540, and Rose & Rose 21724 are L. canescens H.B.K.; Pittier 6172 is L. fucata Lindl.; Acle & Guerrero 145, Cantu, Covell, & McCart 45, Cory 51332, H. C. Hanson 346, M. E. Jones 29186, Martinez & Trevino 29 & 43, McCart

7395 & 7460, and Tharp 5904 are all L. macropoda Torr.; Gaumer & sons 478 is L. microcephala A. Rich.; Miers 85 is Phyla nodiflora var. rosea (D. Don) Moldenke; and Killip 11616 is Hyptis lacustris St.-Hil.

The W. H. Cowgill 2073, cited below, cultivated in Maryland, was raised from seeds of Koelz 2168 from Dacca, Bengal, India.

Range (1935) cites his no. 332; Box cites his no. 1570 from Antigua; Ragonese (1941) cites his no. 2137 from Santa Fé, Argentina; Calderón & Standley cite this species from Santa Tecla, El Salvador. Matuda (1950) cites his nos. 1478, 5213, and 16645 from Mexico, and Rosengurtt (1949) his B.4232 from Uruguay. Hodge (1947) cites Archer 227, Giraldo s.n., and Toro 315 from Colombia. Raimondi (1943) cites the following: PERU: Cajamarca: Raimondi 3644. Lambayeque: Raimondi 750. Lima: Raimondi 10576 & 11879. Loreto: Raimondi 2174. Province undetermined: Raimondi 1287, 2175, 9890, & 11222.

Augusto (1946) cites: BRAZIL: Paraná: Pio Corrêa s.n. Rio Grande do Sul: Augusto s.n. [Pelotas, cêrcas]; Augusto & Edésio s.n. [Morro da Polícia]; João de S. Bárbara s.n. [Perto de Porto Alegre]; Emrich s.n. [Montserrat, margem do Guaíba, Tristeza, Pedra Redonda]; Kadletz s.n. [Rio Grande do Sul]; Sellow s.n. [Perto de Porto Alegre]. URUGUAY: Herter s.n. [Artigas].

Glaziou (1911) cites his nos. 11330, 11331, 14154, 14159, and 21899a from Minas Gerais, Brazil, all as L. geminata except no. 14154 which he identifies as L. asperifolia.

Schauer (1851) cites cultivated specimens from Paris as authentic material of Lantana mollissima Desf. and of Lippia asperifolia A. Rich., deposited in the DeCandolle Herbarium at Geneva; Herb. Willdenow 11512 & 11611 as authentic material of Lantana lavandulacea Willd. and Lippia citrata Cham., respectively, in the Willdenow Herbarium at Berlin; Weigelt s.n. from Surinam; Berlandier 2306 from Mexico; and Poeppig s.n. from Cuba. Also, under L. geminata, he cites Bacle s.n. from Buenos Aires; Joannes de Santa Bárbara s.n., Sellow s.n., & Gardner s.n. from Rio Grande do Sul; Riedel s.n. from São Paulo; Martius s.n. from Bahia; Martius s.n., Pohl s.n., Riedel s.n., and Sieber s.n. from "secundum flumen Amazonum"; Kegel s.n., Perrottet s.n., Schomburgk s.n., and Weigelt s.n. from "in omni Guiana"; Humboldt & Bonpland s.n. from Venezuela; Dombey s.n. from Peru; Berlandier s.n. from "in oris maritimis", Mexico; Poeppig s.n. from Cuba; and Bertero s.n. from Puerto Rico. Under L. asperifolia he cites Gillies s.n. from Córdoba, Martius s.n. from Minas Gerais, Leblond s.n. from British Guiana, Humboldt & Bonpland s.n. from Venezuela, and several African collections.

The E. P. Johnson 50 & s.n., cited below from Tabasco, could as

well have been from Yucatán -- their labels read "Yucatan & Tabasco"; S. Watson 387b, cited below from Chiquimula, is labeled "Eastern portion of Verapaz and Chiquimula"; Commerson s.n., cited from Buenos Aires, Argentina, is actually labeled "Buenos Ayres et Montevideo"; and Langlassé 168, cited by me from Michoacán, Mexico, may actually have been collected in Guerrero, since its label is inscribed merely "Orilla".

In all, 788 herbarium specimens, including types or phototypes of many of the names involved, and 22 mounted photographs and illustrations have been examined by me.

Citations: TEXAS: Cameron Co.: Bogusch & Molby 4193 (Ur); Clover 397 (Mi), 962 (Mi); Correll & Johnston 17926 (Rf); Correll & Robbins 20956 (Ld); Cory 28309 (N), 51445 (Sm); A. M. Davis s.n. [Palm Grove, Sept. '41] (Au); G. L. Fisher 41011 (Ew, Gg--316087), s.n. [Brownsville, Aug. 16, 1924] (Hp), s.n. [Apr. 20, 1941] (Au, Au); H. C. Hanson 434 (G); Herb. Univ. Texas s.n. [Brownsville, 1907] (Au, Au); C. L. Lundell 10644 (N, Rf); Lundell & Lundell 8685 (G, Ld, Mi, Mi, N); Nealley 113 (C, Up--17038); Perkins & Hall 2618 (It); R. Runyon 228 (Au, Au, Au, N, S), 898 [2177] (Rr), 2603 (N), 4361 (Br, N, Ug), s.n. [Brownsville, 1930] (Hp); Schott 46 (T); Tharp 1847 (Au, Au); York s.n. [Brownsville, 3-19-1907] (Au, Au). Hidalgo Co.: Clover 907 (N), 1134 (Mi, N); Correll & Schweinfurth 15661 (Rf); Cory 17 (G), 36095 (G), 36288 (N, N); G. L. Fisher 41096 (W--2261497); A. R. Moldenke 186 (Fg); M. L. Walker 34 (Au). Wharton Co.: J. K. Small s.n. [near Wharton, April 1925] (G); Small & Wherry 11825 (N). Willacy Co.: M. C. Johnston 53253.30 (St). Zapata Co.: Clover 962 (N). County undetermined: Havard s.n. [Sept. 1884] (Mi). MEXICO: Campeche: Houstoun s.n. [Bailey Herb. neg. no. 5057] (N--photo of type). Chiapas: Breedlove 6192 (Z); Matuda 5213 (Ld); Nakamura 1478 (Mh, N). Colima: Edw. Palmer 1303 (G, N). Guanajuato: Collector undesignated 148 (Q). Guerrero: Hinton 5720 (N, Rf), 9242 (K, N, N, Rf), 14024 (G, Mi, N, N, Rf); N. L. H. Krauss 361 (Mm). Jalisco: Bárcena 225 (Me), 544 (Me); Diquet s.n. [Chapala] (N); Galeotti 788 (Br); E. W. Nelson 4142 (G), 6520 (G, N); Edw. Palmer 33 (C, Ca--192610, G, Pa, Sg--16083), 686 (C, G, Me, Me, Pa); Pringle 11085 (Cm, G, It, Me, Me, Me, Me, Me, Me, N, Vt), s.n. [26 July 1893] (Me). México: Hinton 1162 (G, N, N), 1812 (G, N, N), 4101 (N, N); Mrs. D. H. Sheldon s.n. [winter of 1872-3] (G). Michoacán: Hinton 12844 (Du--345854, La, Mi, N, Oa--6687), 13149 (G, Mi, N, N, Rf, S), 13585 (G, N, N, Rf), 13962 (Au, G, N, N, Rf); Langlassé 168 (Cb, G). Nayarit: Feddema 578 (Mi); R. S. Ferris 5927 (Du--185341); M. E. Jones 23230 (Ca--400878, Gg--172662), 23563 (Po--153921); Mexia 819 (G, G, Gg--155849, N), 1929 (Du--195494, G, G, Gg--157098, La, Mi, N). Oaxaca: Conzatti 579 (G); Ghiesbreght s.

n. [Oaxaca] (Ca--322965). San Luis Potosí: V. H. Chase 7482 (G, Ur); Crutchfield & Johnston 5135 (Au--177650); N. L. H. Krauss 273 (Z); W. C. Leavenworth 200 (Ur); Purpus 5289 (Ca--157335, G, N). Sinaloa: J. Gonzalez Ortega 5650 (Me); Rose, Standley, & Russell 14124 (N). Tabasco: Gilly & Hernández Xolocotzi 253 (Au--123195, Mi, N); E. P. Johnson 50 (C), s.n. (C). Tamaulipas: Berlandier 72 (V), 874 (G, N), 2304 (Du--166557, G, M, T); R. M. King 4035 (N); Edw. Palmer 102 (G, Gg--31156, N); Pringle 1960 (Br, C, Ca--104919, G, Io--38721, Me, Me, Me, Mi, Pa, S, Vt), s.n. [8 Aug. 1888] (Ob--50727). Vera Cruz: Ervendberg 112 (G), 162, in part (Cb); Medellin 5 (Me); J. V. Santos 2533 (Mi). State undetermined: M. E. Jones 663 [Armeria] (Po--69159); Sessé, Mociño, Castillo, & Maldonado 2195 (Q), 2196 (Q), 2210 (Q, Q, Q), 2215 (N--photo, Q, S--photo, Z--photo), 2216 (Q), 2221 (Q), 2572 (Q). GUATEMALA: Chiquimula: S. Watson 387b (G). El Petén: C. L. Lundell 4232 (La). Escuintla: J. D. Smith 2062 (C, G). Huehuetenango: Steyermark 50859 (N). Suchitepéquez: Steyermark 35447 (F--1058716). Zacapa: H. H. Bartlett 360 (N); C. C. Deam 360 (G, Mi), 6261 (Ca--201428, G, Mi, N). BRITISH HONDURAS: C. L. Lundell 1819 (Au, Au, F--685351, Mi), 4188 (F--689439, Me, Mi, S), 4232 (F--689453, Mi); Peck 798 (G, N); Schipp 755 (Ca--465288, F--712290, G, G, Mi, N, S). EL SALVADOR: La Libertad: Calderón 1507 (G). Santa Ana: Standley & Padilla V.3230 (N). NICARAGUA: Chinandega: E. Wall s.n. [Corinto, 15/4/28] (Ew). Managua: A. Garnier 308 (N). Department undetermined: Lévy 261 (Cb, Cb); C. Wright s.n. [1853-6] (G). COSTA RICA: Alajuela: Brenes 14320 (G), 21694 (N), s.n. (N). Guanacaste: H. Pittier 2869 (Br, Br); Tonduz s.n. [H. Pittier 13627] (G). San José: Biolley 987 (Br); H. Pittier 344 (Br); M. Valerio 37 (Br). PANAMA: Canal Zone: H. Pittier 3329 (G). Colón: Fendler 220 (Z--photo). CUBA: Havana: León 7530 (Ha, N). Las Villas: Britton, Britton, & Wilson 5492 (N); Ekman 16988 (S), 18893 (N, S); R. A. Howard 4855 (N, N), 5471 (N); J. G. Jack 8407 (N). Matanzas: Alain 3949 (Ha, Hk). Oriente: Acuña & Díaz Barreto 17367 (Es); Carabia 3613 (Ha); Ekman 15784 (S); Herb. Martius s.n. [Macuriges, Apr. 1824] (Br); Hioram 4882 (N), 6724 (Ha); León 11674 (Ha, N, N), 11917 (N), 16740 (Ha, N); Victorin 21414 (Ha). Pinar del Río: León 19725 (N); León & Alain 22855 (N); León, Moldenke, Acuña, & Alain 23404 (N); León, Victorin, & Alain 19725 (Ha). Province undetermined: C. Wright 440 [1860--64; Herb. Sauvalle 1756], in part (Hv), 3157 (S), 3159 [Herb. Sauvalle 1755] (Hv, N, Pa). JAMAICA: N. L. Britton 3917 (N); W. Harris 11737 (N), 11911 (Gg--31164, N, S); Harris & Britton 10593 (N); Maxon & Killip 1636 (Ur); G. R. Proctor 9421 (N); Stearn 675 (Bm). HISPANIOLA: Dominican

Republic: Fuertes 586 (N, S). Haiti: Ekman H.3514 (S), H.8282 (S); Leonard & Leonard 14431 (Ca--439879). PUERTO RICO: Asenjo 30 (As); Barrus 78 (It); Blauner 175 (Cb), s.n. [1852--53] (M); Britton, Britton, & Brown 6070 (N); Eggers 864 (Br); Sintenis 786 (S); J. A. Stevenson 3242 (N); Vélez 1114 (N). VIEQUES: Shafer 2428 (Gg--31163, N). LEEWARD ISLANDS: Antigua: Box 1570 (Ca--938837); Duss 23 (N). Guadeloupe: Duss 3281 (N, N), 4552, in part (N). WINDWARD ISLANDS: Grenada: W. E. Broadway 1825 (N). Martinique: Duss 416 (N, N), 4552 (N); R. A. Howard 11718 (N, N). TRINIDAD: Britton & Britton 2197 (N, W--1069300); W. E. Broadway s.n. [Trin. Bot. Gard. Herb. 8199] (R), s.n. [Trin. Bot. Gard. Herb. 8533] (R), s.n. [September 25, 1932] (I, I); Crüger s.n. [Trin. Bot. Gard. Herb. 2413, in part] (R). MARGARITA ISLAND: J. R. Johnston 81 (Ca--146677, N, W--531920); Miller & Johnston 125 (N, W--417629). PROVIDENCIA ISLAND: Proctor 3469 (W--1979286). WEST INDIES: Island undetermined: Swartz s.n. (S). COLOMBIA: Amazonas: R. E. Schultes 8198 (W--1996275); Schultes & Black 46-1444 (W--1995679). Antioquia: Gallego s.n. [Julio 1946] (Fn, N); Giraldo s.n. [Oct. 1945] (Fn--3023); Tomas 955 (N); Toro Toro 315 (Fn--1646, N). Atlántico: Araque Molina & Barkley 19At082 (N, N); Elias 799 (W--1443114). Bolívar: Heriberto 146 (W--1036911); F. W. Pennell 4143 (W--1043881). Caquetá: Klug 1637 (N, S). Magdalena: Pérez Arbeláez 5164 (W--1693848). Putumayo: Klug 1637 (W--1517962). VENEZUEIA: Angostura: Bailey & Bailey 1236 (Ba), 1236a (Ba). Apure: Chardon 22 (Ve), 23 (Ve); Humboldt & Bonpland s.n. [Macbride photos 39485] (Kr--photo, N--photo, N--photo). Aragua: Vogl 1538 (N). Bolívar: Holt & Gehriger 141 (N, Ve, W--1471858); F. W. Pennell 4143 (N); Tamayo 3430 (Ve, Ve). Delta Amacuro: Bond, Gillin, & Brown 166 (N, W--1189880). Falcón: Tamayo 729 (Ve--12755). Federal District: Boldingh 4129 (Ut--12855); Burkart 16013 (Ve). Lara: H. Pittier 13118 (N, Ve--12759, W--1440418); Saer 196 (Ve, W--1188507). Yaracuy: Burkart 16500 (Ve). Zulia: Mocquerys 851 (S, W--2282484, W--2383049). State undetermined: Mocquerys s.n. [Duaca] (W--2282483, W--2383051). BRITISH GUIANA: Irwin R.120 (Au--165428); Jenman 5450 (C, W--1322921), 5617 (C). SURINAM: Collector undesignated 1241 (Le); Collector undesignated Suriname 80 (Ut); Domburg s.n. [Tulleken 180] (Le); Focke 166 (Le), 321 (Ut); Herb. Acad. Rheno.-Trai. 123 (N); Herb. Coll. Pharmacy s.n. [Surinam] (Pa); Hering s.n. (Le); Hostmann s.n. (Le); Hostmann & Kappler 565 (S); Lanjouw 8 (Ut); Menge s.n. (Br); Pulle 45 (Ut); Soeprato 54 (Ut), 138 (Ut); Stahel 123 (Ut); Tresling 156 (Ut); Versteeg 64 (Ut, Ut), 258 (Ut), 290 (Ut); Weigelt s.n. [1827] (Br, Br, S), s.n. (Gt, Gt, Le); Wullschlägel 407 (Br). FRENCH GUIANA: W. E. Broadway 99 (N); Lemoine 7844 (N); Perrottet s.n. (Mi);

Sagot 469 (S, T). ECUADOR: Bolívar: F. L. Stevens 225 (Ur). Guayas: Asplund 17605 (S); Dodson & Thien 1260 (Ca), 1281 (E); Fagerlind & Wibom 138a (S), 138b (S); A. S. Hitchcock 20206 (N, W—1195201); Mille 799 (W—1573127). Los Ríos: Asplund 5520 (S); Harling 152 (S), 449 (S); S. S. White 5679 (Tl). PERU: Huánuco: Soukup 2231 (W—1876975). La Libertad: Née 107 (Q), 132 (Q). Lambayeque: Angulo 1325 (S). Lima: N. J. Andersson s.n. [Lima, 17 Mars 1852] (N, S, S); Barranca 30 (V); Ridoutt s.n. [Oct. 1939] (Ok); Wilkes s.n. [Lima] (W—72761). Loreto: Asplund 14375 (S, W—2224902); Tessmann 3082 (S); Ll. Williams 1559 (F—612695), 2340 (W—1495220), 4975 (F—624953, S). San Martín: Allard 20564 (W—1999787), 22176 (W—2025401); Ferreyra 10113 (Ss); Ll. Williams 5581 (F—623160), 7325 (F—624511), 7359 (F—623609, W—1498343). Department undetermined: J. T. Baldwin 4730 [Ramon Castilla] (Mi); Herb. U. S. Expl. Exped. [Wilkes] s.n. [Peru] (T). BRAZIL: Amazonas: Poeppig 2614 (V—212658, V, V). Bahia: A. Lutz 211 (Hk), 246 (Lz, Lz). Ceará: Drouet 2561 (I, Lb—24426, Mi, N, S, Sp—38349, Sp). Goías: Macedo 2612 (N, S), 3280 (N), 3943 (S). Maranhão: Ozimo de Carvalho 6 (N, Sp—3462). Matto Grosso: F. C. Hoehne Com. Rondon 7 (Sp); Kuntze s.n. [Mattogrosso, VII.92] (N, N, W—701326); Malme 1880 (S), 1880a (N, S, W—1483440), 2787 (S), s.n. [on banks of Rio Cuyabá near Santo Antonio, July 12, 1903] (S, S). Minas Gerais: Heringer s.n. [Herb. Est. Exp. Café 378] (N, Sp—44564); Ule s.n. [Herb. Mus. Rio de Jan. 14900] (W—1199834). Pará: Archer 8266 (Be—12100, N); Black & Ledoux 50-10292 (Be—61583); Monteiro da Costa 43 (N); Sampaio s.n. [Herb. Rio Jan. 1923] (N); Schwacke 587 (Cb); Sieber s.n. [Pará, comm. Hoffmannsegg 1830] (Br, F—photo, N—photo, Si—photo, Z—photo); A. Silva 372 (W—2439066); Sioli 36 (Be—59457); Spruce 2 (W—1169302). Paraná: Dusén 8634 (S), 14170 (N, S, W—1481651); Hatschbach 3752 (Sm); Hatschbach & Pereira 7863 [Herb. Hatschbach 10478] (Lw); Nogiri 19 (Gg); Stellfeld 1253 [Herb. Mus. Paran. 2364] (N). Pernambuco: G. Gardner 1104 (Cb). Rio de Janeiro: Azevedo Marques s.n. [March 1915] (Je—735); M. Kuhlmann s.n. [Parahyba do Sul, Dec. 2, 1934] (K, Sp—32170, Sp); Mello Barreto 1365 [Herb. Jard. Bot. Belo Horiz. 23266] (Ja—45896); Segadas-Vianna, Dau, Ormond, Machline, & Lorêdo 594 (Ja). Rio Grande do Sul: Czermak & Reineck 340 (Cb); Henz 35351 (N); Joannesa de Santa Bárbara s.n. [Porto Alegre, 1835] (Br), s.n. [1836] (Br, F—photo, N—photo, Si—photo, Z—photo); Leite 660 (N); Malme 768 (S, S); Rambo 38012 (N), 49694 (N); Reitz C.359 (N); Sehnem 3872 (B). Rio Negro: G. H. H. Tate 130 (N). Santa Catarina: Lorentz s.n. [Concepcion del Uruguay] (B); Reitz & Klein 2387 (Gg). São Paulo: A. S. Costa Serra s.n. [Campinas, June 21, 1935] (K, Sp—33440, Sp);

J. T. Lima s.n. [Herb. Jard. Bot. Rio Jan. 48998] (N); Luederwald s.n. (N, Sp--20080); B. de Oliveira s.n. [Capital] (Sp--30276, Sp); Pereira 926 (N, Wh, Wh), s.n. [Capital, Jan. 13, 1942] (Sp--46292). State undetermined: Collector undesignated 183 (C); J. E. Pohl s.n. [Brasiliae, comm. Mus. Caes. Vindob. 1839] (Br, F--photo, N--photo, Si--photo, Z--photo), s.n. (Br); Sellow s.n. [Brasilia] (Br, Vt); Ule s.n. (Ja--32325). BOLIVIA: El Beni: M. Cárdenas 3761 (S); Fleischmann 107 (S); H. H. Rusby 916 (C, Pa, Pr); Werdermann 2410 (E--999966, S). La Paz: Buchtien 1458 (W--1177996); H. H. Rusby 704 (Mi, W--1232237); O. E. White 905 (Mi, N, Pa, W--1232269). Santa Cruz: T. Herzog 1429 (S). Tarija: R. E. Fries 1425 (S); Pflanz 2093 (W--1234341). PARAGUAY: Hassler 960 (N, N), 7367 (Ca--944342, N, S), 7397 (Ca--944341, N, S), 11112 (Ca--930219, Go, N, S, W--1056911); Kuntze s.n. [Concepcion, Nord Paraguay] (N), s.n. [Concepcion] (N); Malme 902 (N, S, S); Edw. Palmer s.n. [Paraguay River] (W--41139); T. Rojas 406 [Herb. Osten 7898] (Ug), 495 [Herb. Hassler 495; Herb. Osten 8326] (Ug), 1406 [Herb. Osten 7898] (S), 1874 [Herb. Hort. Parag. 10060; Herb. Osten 13566] (N, Ug), 1874a [Herb. Hort. Parag. 10060a; Herb. Osten 13567] (Ug), 1875 [Herb. Hort. Parag. 10061; Herb. Osten 13563] (Ug), 1875a [Herb. Hort. Parag. 10065a; Herb. Osten 13564] (Ug), 8326 (Go), s.n. [San Bernardino, June 1915; Herb. Hicken 242; Herb. Osten 7534] (Ug), s.n. [Concepcion, Dec. 1916; Herb. Osten 13563] (S); Sandeman 4871 (K). ISLA DEL TORO: Grtner 1027 [Herb. Osten 23169] (Ug). URUGUAY: Arechavaleta 8 [Mercedes, Feb.] (Ug), 8 [Paso de los Toros, April] (Ug), 1132 (N), s.n. [Pocitos, Buceo, & vic. of Montevideo; Herb. Osten 3753] (Ug); Berro 86 (N); Cabrera 2581 (N, N, N); Castellanos s.n. [Punta Piedras, Nov. 10, 1946; Herb. Inst. Miguel Lillo 15761] (N), s.n. [Bella Unión, Jan. 28, 1948; Herb. Inst. Miguel Lillo 15044] (N); Chebataroff s.n. [dept. Rio Negro, Jan. 1939] (Ug--4736); Collector undesignated s.n. [Maldonado, 25 Dec. 1884] (Ug, Ug, Ug), s.n. (Ug--5705, Ug, Ug); Gibert 7 (Ug); Herb. Herter 10053 (N), 95310 (N); Herter 747 [Herb. Herter 82833] (B, Ca--323334, N, N, S, W--1344155), 747a [Herb. Herter 82658] (N), s.n. [Nueva Palmira, April 1926; Herb. Osten 19033] (Ug, Ug); King 147 (S); Lorentz 49 (B); Osorio s.n. [Bella Unión, Jan. 28, 1948] (N, Ug--13930); Rosengurtt B.950 (N), B.1959 (N), B.4232 (Ug--8278); Schröder s.n. [Colonia, Jan. 30, 1922; Herb. Osten 16469] (Ug), s.n. [Paysandú, Dec. 1924; Herb. Osten 17309] (Ug); Scolnik 36 (W--2045547); Teissene 4476 (Ug). ARGENTINA: Buenos Aires: N. J. Andersson s.n. [Buenos Ayres, 1852] (N, S); Commerson s.n. [Buenos Ayres et Montevideo] (N); Lefebre s.n. [Ensenada, 1891] (Br); Venturi 117 (S). Chaco: Jürgensen 2471 [Herb. Osten 11876] (Ug, W--1055179), s.n. [Herb. Mus. Argent. Ci-

enc. Nat. 23944] (N); T. Meyer 135 [Herb. Osten 22658] (Ug), 8790 (N, S); T. Rojas 12082 (S); A. G. Schulz 134 [Herb. Mus. Argent. Cienc. Nat. 6471] (N), 1500 (N), 1501 (N); C. L. Schulz 863 (N); Venturi 39 (W--1043612). Corrientes: Cabrera 11623 (W--2197996); Ibarrola 894 (W--1934140); Malme s.n. [Empredados, 5/1902] (S); Pedersen 1153 (N, W--2283036), 1906 (N, S, W--2283115); Ruíz Huidobro 2037 (Gg--406032, S), 2180 (S), 3879 (N), 3888 (N); Ruíz Leal 14266 (Ss); G. J. Schwarz 126 (Ca), 250 (Ca), 559 (Ca); Wroth 59 (S). Entre Ríos: T. Meyer 10058 (N), 10404 (N), 10580 (N); I. Morel 194 (N); Rodrigo 952 (N); F. A. Roig 1263 [Herb. Ruíz Leal 18362] (Sm); Scala 2003 (N, N, N, S, Ug), s.n. [4-XI-29] (La). Formosa: Eyerdam & Beetle 22993 (Ca--652424); I. Morel 194 (S), 690 (N, Ur), 1120 (N), 1314 (N), 1491 (N), 1636 (N); Pierotti 1087 (N); Reales 480 (N). Misiones: Ekman 2015 (N, S); Montes 990 (Ca); D. Rodriguez 616 (Ca--3490), 6161 [Herb. Inst. Miguel Lillo 32241] (N), s.n. [Herb. Mus. Argent. Cienc. Nat. 23771] (N). Salta: Schreiter s.n. [Embarcacion, Dec. 20, 1925; Herb. Osten 20678] (Ug). San Juan: Cuezzo 1127 (N). Santa Fé: R. Alvarez 909 (N); Job 650 (N, N), 748 (N, N); Ragonese s.n. [Herb. Mus. Argent. Cienc. Nat. 19776] (N); Ruíz Huidobro 3078 (N), 3116 (N), 3230 (N, S), 3292 (N), 3309 (N), 3343 (N), 3387 (N); Venturi s.n. [Herb. Mus. Argent. Cienc. Nat. 23767] (N). Tucumán: Lorentz & Hieronymus 1174 (N); E. Romero s.n. [28/1/945] (Ca); Venturi 4294 (N). Chica Island [Misiones]: Montes 990 (S). Laguna Oca Island [Formosa]: T. Rojas 12212 (S). Puentes Island [Entre Ríos]: T. Meyer 10099 (N). PAKISTAN: East Bengal: Koelz 10667 (Mi). INDIA: Assam: Chand 7692 (Mi); Hooker & Thomson 5 (S); Koelz 22492 (Mi). Khasi States: G. Mann s.n. [Khasia] (Bz--21774). AUSTRALIA: Queensland: Baron s.n. [Rockhampton] (Sg--16072). CULTIVATED: Argentina: Miers 1206 (W--1343921). Belgium: Crépin s.n. (Br). Brazil: Barbosa da Silva 2 (Be--13382, N, W--2439590); Coelho 2194 (Sf); Henz 35351 (S), s.n. [Rambo 35351] (N); Lados s.n. [Herb. Inst. Nac. Pesquis. Amaz. 1951] (Ok); Moldenke & Moldenke 19630 (Es, Lg, N); Sampaio 1486 (Ja--46752); Siqueira s.n. [Capital, Dec. 7, 1942] (Sp--47560); Tiberio de Moraes 1980 (Sf). Colombia: Cuatrecasas 22834 (F--1280034). Costa Rica: Tonduz 6723 (Br, Br, N). Cuba: Acuña 16063 (Es); Ekman 10314 (N, S); León 11917 (Ha); Marie-Victorin 21351 (Vi), 21414 (Vi); Moldenke & Moldenke 19884 (Es, Lg, N, Sm). Dominican Republic: Ekman H.15802 (N, S). England: Hort. Barclay s.n. [15-6-30] (C). France: Herb. Jewett s.n. [h. P.] (Mi). Germany: Lucae s.n. [Hort. bot. berol. 1844] (Br). Guadeloupe: Duss 4552, in part (N). Haiti: Ekman H.718 (S), H.9808 (S); E. C. Leonard 8515 (N). India: Herb. Hort. Bot. Calcuttensis s.n. (Bz--21668). Martinique: Duss 4765 (N).

Maryland: W. H. Cowgill 2073 [Koelz 2168; Plant Quarant. 050726] (Ba). Mexico: Wonderly 52 (Mi). Surinam: Kappler 1860 (Cp, Gt, S, Ut); Kegel 1240 (Gt). Texas: F. B. Jones 4128 (Fj). Tortue: Leonard & Leonard 15470 (N). Venezuela: Tamayo 1891 (Ve--12756). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 85 (Q), 150 [Mastrante] (Q), s.n. (Q); Née 99 (Q), 118 (Q), 129 (Q); Tweedie s.n. [1837] (C). MOUNTED ILLUSTRATIONS: L'Héritier, Stirp. Nov. 1: pl. 12 (S); Pohl, Icon. Plant. Brasil. 302 (V--drawing).

LIPPIA ALBA var. CARTERAE Moldenke, Phytologia 7: 430. 1961.

Bibliography: Moldenke, Phytologia 7: 430. 1961; Moldenke, Résumé Suppl. 3: 9. 1962; Hocking, Excerpt. Bot. A.5: 44. 1962.

This variety differs from the typical form of the species in having clear-yellow corollas.

The type of the variety was collected by Annette Carter -- in whose honor it is named -- and Roxana Ferris (no. 3864) in the protection of other shrubs in the dry rocky bed of Arroyo Santo Domingo, bordered with Prosopis, Acacia brandegeana, Jatropha cinerea, Lophocereus schottii, Opuntia, and Bumelia, at Rancho El Horno, northeast of San Xavier, at an altitude of 435 meters, Sierra de la Giganta, southern Baja California, Mexico, at latitude 25°53.25' N., longitude 111°33' W., on March 17, 1960, and is deposited in the herbarium of the University of California at Berkeley. The collectors note that the plant is a shrub with a trunk 2--4 cm. in diameter, growing to 3 meters tall, with aromatic herbage, flowering in March, and called "salvia real" -- except where protected by other shrubs all the plants are browsed by goats and cattle to within a few inches of the ground; used as a tea and also in the treatment of respiratory afflictions.

Only two herbarium specimens, including the type, have been examined by me.

Citations: MEXICO: Baja California: Carter & Ferris 3864 (Ca--199588--type, Z--isotype).

LIPPIA ALNIFOLIA Schau. in A. DC., Prodr. 11: 588. 1847.

Synonymy: Lippia alnifolia Mart. & Schau. ex Schau. in Mart., Fl. Bras. 9: 242. 1851. Lippia brasiliensis A. S. Müller ex Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95, nom. nud. 1942. Lantana odora Mart. ex Moldenke, Résumé Suppl. 10: 5, in syn. 1964.

Bibliography: Schau. in A. DC., Prodr. 11: 588. 1847; Schau. in Mart., Fl. Bras. 9: 242. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Invalid Names 13. 1947; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 46. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; Moldenke, Alph. List Cit. 3: 691, 712, & 754. 1949; Moldenke, Résumé 93, 311, & 460. 1959; Moldenke, Résumé Suppl. 10: 5. 1964.

# BOOK REVIEW

Alma L. Moldenke

"Plant Biochemistry", by D. D. Davies, J. Giovanelli, & T. Ap Rees, xi + 454 pp., illust. F. A. Davis Co., Philadelphia, Pennsylvania. 1964. $10.50

These authors from "down under" have compiled an excellent, carefully constructed text to "supplement existing ones on plant physiology" and presupposing a background of at least two years of modern chemistry. Plant biochemistry can exist as distinct from animal (and protist) biochemistry only in those few and minor cases where the end products and pathways involve botanically unique ones. Surely students advanced enough to use this text would understand that most reactions and products are common to all living things. As some of the following chapter headings indicate, the book stresses those biochemical pathways that involve materials mainly characteristic of the plant world, (1) proteins and enzymes specifically, (2) bioenergics with emphasis on energy conservation by the formation of anhydrous high energy compounds and the coupling by coenzymes of oxidative reactions and reductive biosynthesis reactions, (3) carbohydrates, (4) organic acid metabolism with special emphasis on the Krebs cycle, (5) oxidation through the respiratory chain and phosphorylation with its coupling to hydrogen transfer, (6) photosynthesis whose basic reaction is the phosphorylation of ADP to ATP cyclically, (7) lipid metabolism, (8) isopentane compounds, (9) alkaloids, (10) amino acid metabolism and (11) nucleic acid and protein synthesis. The chapter on carbohydrates is probably the best one.

There are excellent diagrams (even though the carbon molecule markings should have been clearer on p. 169), a limited index, and two good sets of bibliography at the end of each chapter - one a well chosen "reading list", - the other, "literature cited" which would have been more useful if there were connected text reference numbers used. All classical abbreviations are identified at the beginning of the book.

# PHYTOLOGIA

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## THE HAWAIIAN GENUS NEOWIMMERIA (LOBELIACEAE)

Otto & Isa Degener

Thanks to Dr. R. Melville's note (Kew Bull. 19: 206. 1965), we here belatedly typify the Hawaiian genus Neowimmeria by the species Lobelia grayana E. Wimm. (in Annal. Naturhist. Mus. Wien 56: 369. 1948) = N. grayana (E. Wimm.) Deg. & Deg. in Fl. Haw. $K_{16}$, March 29, 1963. The type for the species was collected by the United States Exploring Expedition of 1838-1842, and exists in fragmentary condition in the Gray Herbarium of Harvard University. The above typification of the genus should legitimize the species names N. costata, N. dunbariae, N. hillebrandii, N. hypoleuca, N. niihauensis, N. remyi, N. tortuosa and N. yuccoides, all of which are new combinations proposed by Degener & Degener in the same publication on March 29, 1963.

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## MATERIALS TOWARD A MONOGRAPH OF THE GENUS LIPPIA. II

Harold N. Moldenke

LIPPIA ALNIFOLIA Schau.

Tall shrub, glandular-dotted throughout; branches strict, as thick as a goose-quill, subterete, fuscous, strigose-pubescent and scabrous; principal internodes shorter than the leaves; leaves decussate-opposite, ovate or subrotund-elliptic, about the size and shape of those of Almus glutinosa (L.) Gaertn., narrowed at the base into the petiole, very obtuse at the apex, very shiny above, penninerved, coarsely crenate, venose and rugulose, strongly aromatic with a camphor-like odor, short-strigose and scabrous above, the hairs simple or subpapillose at the base, villosulous beneath, diminishing in size toward the apex of the stems and branches; peduncles axillary, 2--4 per axil, about 2.5 cm. long, thickened upwards, patulous, pubescent; heads subglobose-ovoid, about 8 mm. wide; bractlets membranous, broadly ovate, 4 mm. or more in length, short-acuminate at the apex, concave, many-nerved, pubescent, ciliate-margined, loosely imbricate, shorter than the corolla-tube, the outer ones larger and subinvolucrate; calyx tubular, villosulous, shortly 4-fid; corolla white, its tube 6 mm. long, straight, slender below, subventricose above the middle, villosulous, the limb rather large, the lobes rounded, the lateral ones reflexed, the back concave and crisped; fruit small, 2 mm. long, obcordate-oblong, very smooth, fuscous, included by the fruiting-calyx, easily split into 2 parts.

This apparently rare species was based on several collections made by Carl Friedrich Philipp von Martius "In campis graminosis Brasiliae, in prov. Minarum e. gr. ad Munbucas deserti Minarum novarum, Julio, nec non inter frutices montis Serra de Sincora prov. Bahiensis, Octobri", deposited in the Martius Herbarium in the Botanical Museum at Munich. Lippia brasiliensis is based on A. S. Muller 469 from Vicosa, Escola, Minas Gerais, Brazil, collected on April 18, 1933, and deposited in the Britton Herbarium at the New York Botanical Garden, gathered for the fungous infection on its leaves. Lantana odora is based on a Martius collection from Minas Gerais deposited in the Munich herbarium and there photographed by Macbride as a cotype of Lippia alnifolia under his type photograph number 20321.

The species is placed by Schauer (1851) in Section Zapania, Subsection Axilliflorae. He says of it "trita odorem fortem subcamphorato aromaticum spargentia."

In all, only 1 herbarium specimen and 3 mounted photographs of a cotype collection have been examined by me.

Citations: BRAZIL: Minas Gerais: Martius s.n. [Macbride photo 20321] (It—photo of cotype, Kr—photo of cotype, N—photo of cotype); A. S. Muller 469 (N).

LIPPIA AMERICANA L., Sp. Pl., ed. 1, 633. 1753.

Synonymy: Lippia hemisphaerica Jacq., Enum. Syst. Pl. Carib., ed. 1, 25. 1760. Lippia arborescens, foliis conjugatis oblongis, capitulis squamosis & rotundis Houst. ex P. Mill., Gard. Dict., ed. 5, Lippia. 1763. Lippia pyramidata Crantz, Inst. 1: 546. 1766. Lippia (Americana) arborescens foliis conjugatis oblongis, capitulis squamosis & rotundis Houst. ex P. Mill., Gard. Dict., ed. 8, Lippia 1. 1768. Lippia capitulis pyramidatis L. ex P. Mill., Gard. Dict., ed. 8, Lippia 1, in syn. 1768. Lippia (Hemisphaerica) capitulis hemisphaericis Jacq. ex P. Mill., Gard. Dict., ed. 8, Lippia 2. 1768. Lippia americana, arborescens, foliis conjugatis, oblongis, capitulis squamosis & rotundis Houst. ex P. Mill., Dict. Jard. 4: 472—474. 1785. Lippia hemisphaerica capitulis hemisphaericis Jacq. ex P. Mill., Dict. Jard. 4: 472—474. 1785. Lippia floribunda H.B.K., Nov. Gen. & Sp. Pl., ed. pict. 216. 1817 [not L. floribunda Briq., 1900, nor Hort., 1959, nor R. A. Phil., 1891]. Lippia floribunda Kunth ex Spreng. in L., Syst. Veg., ed. 16, 2: 753. 1825. Lippia floribunda Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 54. 1841. Lippia hemisphaerica L. ex Steud., Nom. Bot., ed. 2, 2: 54. 1841. Lippia floribunda Humb. & Kunth ex D. Dietr., Syn. Pl. 3: 599. 1843. Lippia pauciserrata Turcz., Bull. Soc. Nat. Mosc. 36 (2): 203. 1863. Lippia hemisphaerica Cham. ex Pittier, Supl. Pl. Usual. Venez. 55. 1939. Lippia hemispherica Jacq. apud Pittier, Cat. Fl. Venez. 2: 333. 1947. Lippia hemisferica Cham. apud Daniel,

Verbenac. Cent. Antioq. 5. 1947. Lippia hemispherica Cham. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia fruticosa Kunth ex Moldenke, Résumé Suppl. 10: 5, in syn. 1964.

Bibliography: L., Sp. Pl., ed. 1, 633. 1753; Jacq., Enum. Syst. Pl. Carib., ed. 1, 25 (1760) and ed. 2, 25. 1762; P. Mill., Gard. Dict., ed. 5, Lippia. 1763; Jacq., Select. Stirp. Amer. Hist. 176, pl. 179. 1763; P. Mill., Gard. Dict., ed. 7, Lippia. 1764; Crantz, Inst. 1: 546. 1766; P. Mill., Gard. Dict., ed. 8, Lippia 1 & 2 (1768) and ed. 6, Lippia. 1771; Jacq., Select. Stirp. Amer. Hist. Picta pl. 167. 1780; Houst., Reliq. pl. 12. 1781; P. Mill., Dict. Jard. 4: 472—474. 1785; Gaertn., Fruct. & Sem. Pl. 1: 235—236 & 266—267, pl. 51, fig. 2, & 56, fig. 2. 1788; Gil & Xuarez, Osserv. pl. 5. 1790; Lam., Tabl. Encycl. Méth. Bot. [Illustr.] 3: 91, pl. 539, fig. 1 & 2. 1797; Dum. Cours, Bot. Cult., ed. 2, 7: 130—131. 1814; H. B. K., Nov. Gen. & Sp. Pl., ed. pict., 216. 1817; H.B.K., Nov. Gen. & Sp. Pl. 2: 267—268. 1818; Choisy, Mém. Soc. Phys. & Hist. Nat. Genev. 2: 98. 1823; Spreng. in L., Syst. Veg., ed. 16, 2: 751 & 753. 1825; Steud., Nom. Bot., ed. 2, 2: 54. 1841; D. Dietr., Syn. Pl. 3: 596 & 599. 1843; Walp., Repert. Bot. Syst. 4: 43 & 54. 1845; Schau. in A. DC., Prodr. 11: 579. 1847; Morren, Belg. Hort. 1: 151. 1851; Turcz., Bull. Soc. Nat. Mosc. 36 (2): 203 & 204. 1863; Bocq., Adansonia 3: 244. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 152. 1895; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1248. 1924; Stapf, Ind. Lond. 4: 125. 1930; Pittier, Supl. Pl. Usual. Venez. 55. 1939; Moldenke in Woodson & Schery, Ann. Mo. Bot. Gard. 27: 336. 1940; Moldenke, Carnegie Inst. Wash. Publ. 522: 164. 1940; Robledo, Lecc. Bot. 2: 498. 1940; Moldenke, Prelim. Alph. List Invalid Names 31. 1940; Moldenke, Suppl. List Invalid Names 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 24, 31, 32, 34, & 95. 1942; Moldenke, Alph. List Invalid Names 31 & 32. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 53. 1942; Moldenke, Lilloa 8: 413 (1942) and 10: 367. 1944; Moldenke, Castanea 10: 41. 1945; Moldenke, Alph. List Cit. 1: 7, 169, 190, 194, & 266. 1946; Pittier, Cat. Fl. Venez. 2: 333. 1947; Daniel, Verbenac. Cent. Antioq. 5. 1947; Moldenke, Alph. List Invalid Names 14 & 15. 1947; Moldenke, Phytologia 2: 384 & 385. 1947; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 45. 1947; Moldenke, Lilloa 14: 16. 1948; Moldenke, Castanea 13: 116. 1948; Moldenke, Alph. List Cit. 2: 361, 416, 530, 544, 558, & 610 (1948), 3: 693, 820, 893, 903, 906, & 947 (1949), and 4: 1148, 1164, 1175, 1208, 1210, 1248, 1259, & 1261. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 30, 41, 60, 63, 70, 72, & 189. 1949; Moldenke, Phytologia 3: 285. 1950; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 289. 1950; F. A. Barkley, Determinac. Ejemp. Herb. Fac. Nac. Agron. Medellin 2 (1): 11 & 14. 1950; Moldenke, Résumé 36, 48, 67, 71, 80, 84, 312, 313, 316, & 460. 1959; Troncoso, Darwiniana 12: 257. 1961; Moldenke, Résumé Suppl. 8: 4 (1964) and 10: 2 & 5. 1964.

Illustrations: Houst., Reliq. pl. 12. 1781; Gaertn., Fruct. & Sem. Pl. 1: pl. 56, fig. 2. 1788; Gil & Xuarez, Osserv. pl. 5. 1790; Lam., Tabl. Encycl. Méth. Bot. [Illustr.] 3: pl. 539, fig. 1 & 2. 1797.

An herb. woody or somewhat woody below, or a slender, sprawling, arching, scrambling, or scandent shrub or undershrub, 1--5 m. tall, unarmed, subglabrous, with a strong aromatic odor; trunk sometimes 15--20 cm. in diameter; branches elongate, drooping or pendulous to subscandent, light-green, the adult ones subterete, yellowish, and glabrous; branchlets tetragonal, sparsely appressed-strigose and glandular-punctate; leaves decussate-opposite or ternate, green or light-green, membranous, widely spreading or reflexed, deciduous, ovate or oblong-lanceolate, shiny, acuminate at the apex, entire or crenate-serrate above the middle, acuminate and entire at the base and attenuate into the petiole, scabrous above, pale and glabrous beneath or sparsely strigose on the veinlet-reticulation and pubescent in the vein-axils, the lower ones about 8 cm. long and 3.5 cm. wide, the upper ones smaller; inflorescence axillary; peduncles 1--3 per axil, subequaling the petiole; heads hemispheric, becoming ovate or pyramidal-subglobose, about the size of a pea (Pisum sativum L.), many-flowered, plainly angulate; bractlets cuneate-obovate, subequally imbricate in 8-farious fashion, recurved, abruptly cuspidate or broadly very obtuse and very short-apiculate at the apex, subequaling the corolla, many-nerved, slightly narrower than the calyx villosity, the lower ones somewhat larger; flowers not conspicuous; calyx 1--1.5 mm. long, equaling or shorter than the corolla-tube, acutely bifid, bifariously villous with long hairs on the keel, otherwise shortly white-pubescent; corolla small, hypocrateriform, not conspicuous, varying from pale-green or greenish-white to cream, white, or pale-yellow, its tube very exiguous, the limb hirtellous or pubescent on the outer surface; fruit obcordate, fuscous or black, smooth, included at the base of the calyx.

The type of this species, which is also the type of the genus, is sheet number "1" under genus 801 in the Linnean Herbarium at the Linnean Society, London, labeled "americana", and probably collected by William Houstoun in Vera Cruz, Mexico, although this information is not given on the sheet. In his original description, however, Linnaeus (1753) states that the plant is from that locality. Standley (1924) lists the species as only doubtfully from Mexico, and I have as yet seen no material (other than the type itself) from there. The Linnean specimen shows one head of inflorescence in each leaf-axil, about 3/4 inch long, on a peduncle about 1/2 inch long, the leaves exactly like those of the plants currently passing as L. hemisphaerica Jacq. from Colombia, but the general habit of the plant seems to be like that of L. alba (Mill.) N. E. Br. One wonders if Linnaeus was in error in ascribing the type specimen to Houstoun from Mexico.

The type of L. pauciserrata was gathered by Louis Joseph Schlim (no. 274) at Aguachica, Ocana, Santander do Norte, at an altitude of 800 feet, Colombia, in November, between 1846 and 1852 -- an

isotype in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva having been photographed by Macbride as his type photograph number 24657. The type of L. hemisphaerica was collected "in sylvaticis regni Novo-Granatensi pr. Carthagenam", according to Jacquin (1760). Schauer (1847) describes the branchlets of L. hemisphaerica as hispid-pilose, which raises the possibility of this name belonging to the synonymy of L. americana f. hyptoides (Benth.) Moldenke. Perhaps his descriptive term, however, applies to the Ruíz collection from "in Peruvia ad Guayaquil" which he also cites, rather than to Jacquin's type. He says of L. hemisphaerica "Simillima praecedenti [L. americana], tamen distincta facilis capitulis obtuse-bracteatis haud angulatis, calyce minore brevius villoso. Calyx semilineam longus, acute bifidus, villo bracteam non excedente. Cor. calyce duplo longior, extus puberula."

The name, Lippia fruticosa Kunth, seems to be based on an unnumbered collection made by Gustav Karl Wilhelm Hermann Karsten at Diballa, Rio Hache, and deposited in the herbarium of the Naturhistorisches Museum at Vienna.

The L. floribunda of Philippi, referred to in the synonymy above, is actually a synonym of Aloysia reichii Moldenke, that of Briquet is Lippia moritzii Turcz., while that accredited to "Hort." is Lantana achyranthifolia Desf. Walpers (1845) places Dalea lippiastrum Gaertn. in the synonymy of Lippia americana, but according to Choisy (1823) this name belongs to Microdon ovatus (L.) Choisy in the Selaginaceae.

Lippia americana is placed by Briquet (1895) in Subgenus Zapania, Section Dipterocalyx. Kunth (1818) states that it is closest to L. hirsuta L. f. The L. hyptoides Benth., often included in its synonymy, is actually the basinym of what is here regarded as L. americana f. hyptoides (Benth.) Moldenke. The specific epithet, as also that of L. hemisphaerica, is sometimes uppercased.

Lippia americana seems to inhabit thickets and dry thickets, woods and deep wooded canyons, the edges of woods, savannas, shrubby hillsides, and sandy soil near beaches, and has been found along streams and roadsides, at altitudes from sea-level to 1665 meters, flowering in March and from May to December, in fruit from October to January, in June and August. Common names recorded for it are "barelago", "belíta", "lippie d'Amérique", "lippie hémisphérique", "mano de Dios", "oreganito macho", and "tree lippia".

Haught describes the species as "abundant in this region" [Goajira, Colombia] and "abundant on roadsides", while H. H. Smith says of it in Magdalena "very common in dry forest below 1000 feet, fls. Sept. to Nov., leaves fall off about the end of Dec. and the smaller branches die." Sandeman found it "in full exposure among semi-xerophytic scrub" in Cajamarca, Peru.

Daniel (1947) says of it: "En los lugares bajos [in Antioquia]

y en sitios arenosos se suele encontrar otra forma que llama la atención por su simetría y por la disposición regular de sus capítulos al parecer esféricos; es Lippia hemisférica Cham., que tiene sus flores blancas agrupadas en capítulos casi sésiles y axilares. La muestra en estudio proviene de Megua y se debe su colección al diligente entusiasmo del Rdo. Hno. Elías mientras estuvo en Barranquilla por los años de 1933."

The corollas are described as "cream" on Asplund 7685; as "greenish-white" on Asplund 15733; as "pale-green" on Asplund 15879; as "pale-yellow" on Allen 1094; and as "white" on Asplund 15752, Cuatrecasas & Castañeda 24879, Elias 1094, Haught 4407 & 6726, F. W. Pennell 12064, and Schlim 274.

It is of interest to note here how Miller (1768) differentiates between L. americana and L. hemisphaerica and what he says of them: "1. Lippia (Americana) arborescens foliis conjugatis oblongis, capitulis squamosis & rotundis. Houst. Tree Lippia with oblong leaves growing by pairs, having round scaly heads. Lippia capitulis pyramidatis, Lin. Sp. 883. Lippia with pyramidal heads. 2. Lippia (Hemisphaerica) capitulis hemisphaericis. Jacq. Amer. 25. Lippia with hemisphaeric heads. The first sort in the country of its native growth, commonly rises to a height of sixteen or eighteen feet, with a rough bark: the branches come out by pairs opposite, as do also the leaves, which are oblong, pointed, and a little sawed at their edges. From the wings of the leaves come out the foot-stalks, which sustain many pyramidal scaly heads, about the size of a large gray Pea, in which are many small yellow flowers appearing between the scales, which are succeeded by the seed-vessels.

"The second sort grows naturally in Carthagena in New Spain, where it rises with shrubby stalks ten or twelve feet high, sending out slender branches toward their top, garnished with oval spear-shaped leaves three inches long, ending in acute points, smooth on their upper surface, which are placed opposite; the foot-stalks of the flowers come out opposite just above the leaves, each supporting a pyramidal head of white flowers which peep out from the scales of the head; these are succeeded by capsules having two cells, including small seeds.

"The seeds of the first sort were sent by Dr. Houstoun to several curious gardens in Europe, where some of the plants have been raised; but as the country from whence they came is very warm, so the plants will not thrive in this climate, unless they are preserved in a warm stove. The seeds should be sown on a hot-bed, and the plants may be treated in the same manner as other shrubby plants which are natives of warm countries: which is, to keep them always in the stove, plunged in the bark-bed, observing to give them a large share of air in warm weather, and frequently refresh them with water; but in winter they must be watered more sparingly, and be kept in a moderate degree of warmth, otherwise they will not live through the winter, especially while they are young; but when they have acquired strength, they may be preserved

in a less share of warmth. As the plants advance in their growth, they should be shifted into larger pots, but this should not be too often repeated; for if they are removed into new pots every spring, it will be as often as they require; so that when these, and many other exotic plants, are too often removed, they do not thrive so well as when they are permitted to fill the pots with their roots. The best time to shift these plants is in April, at which time the tan of the hot-bed should be stirred, and fresh tan mixed with it, to increase the heat. The earth in which these plants are placed, should be fresh and light, but not too rich."

Lamarck (1797) distinguishes the two as follows: L. hemisphaerica -- "capitulis hemisphaericis", L. americana -- "capitulis ovato-subrotundis". Lam., Tabl. Méth. Bot. 3: 91, pl. 539 (1797) is often cited as "Lam. Ill. 3. pl. 529", but the plate number referred to is 539. Gaertn., Fruct. & Sem. Pl. 1: 266--267, pl. 56, fig. 2 (1788) is sometimes erroneously cited as plate "55".

Herbarium material of this species has been misidentified and distributed in herbaria as "Rubiaceae". On the other hand, the N. J. Andersson 83, A. S. Hitchcock 20111, and Hartweg 686, distributed as L. hemisphaerica, are actually L. americana f. hyptoides (Benth.) Moldenke, the last-mentioned collection being the type of the form, and Holway & Holway 807, Killip & Smith 14238, 14342, & 14518, Pittier 10541, and Killip, Dugand, & Jaramillo 38334 are L. americana f. pilosa Moldenke, the last-mentioned collection being the type of the form, while the Mocquerys s.n. [Duaca, 1893-94] (W--2383050), distributed as this by Troncoso, is a species of Cordia in the Ehretiaceae; the Collector undesignated 1 and Herb. Mus. Paris 1, distributed as L. floribunda by her, are L. moritzii Turcz., while Galeotti 787 is L. pringlei Briq.

Schauer (1847) cites under L. americana a Linnean specimen from Vera Cruz [doubtless the Houstoun collection which is the type of the species], Billbery s.n. [doubless an error for "Billberg"] from Cartagena, Colombia, Mutis s.n. from "in regno Novo-Granatensi", and Hartweg 686 from Guayaquil, Ecuador, all except the first deposited in the Berlin herbarium, now destroyed. The last-mentioned collection, however, is the type collection of f. hyptoides. Under L. hemisphaerica he cites a Jacquin plant from "in sylvis regni Novo-Granatensi pr. Carthagenam" and a Ruíz collection from Guayaquil, also in the Berlin herbarium, now destroyed. Pollen of P. H. Allen 1094 is preserved in the slide collection of the Harvard University herbarium.

In all, 63 herbarium specimens and 8 mounted photographs, including type material of most of the names involved, have been examined by me.

Citations: MEXICO: Vera Cruz: Houstoun s.n. [Herb. Linnaeus G. 801, S. 1] (Ls--type, N--photo of type, Z--photo of type). PANAMA: Herrera: P. H. Allen 1094 (G, N, N). COLOMBIA: Atlántico:

Dugand 501 (N), 3604 (W--1854152), 3611 (S); Elias 326 (W--1344826), 344 (W--1344843), 391 (W--1344889), 1037 (N), 1094 (N, N, N, W--1499779), s.n. [Barranquilla, XII.28] (Um--127); Kattáh, Araque Molina, & Barkley 19At017 (N, N); F. W. Pennell 12064 (W--1143339). Bolívar: Araque Molina & Barkley 19Bo016 (N); Billberg 26 (Lu, N, S), s.n. [Carthagena, 1826] (S, S); Collector undesignated s.n. (S); Heriberto 161 (N, W--1036925); A. C. V. Schott 7 (C). Goajira: Cuatrecasas & Castefleda 25518 (Fg); Haught 4407 (N, N, W--1709346). Magdalena: Cuatrecasas & Castañeda 24879 (Z); Espina & Giacometto B.4a [Herb. Mus. Yale School Forest. 20986] (N, N, W--1484814); Haught 3810 (N, S), 3873 (N), 6726 (Hw); H. H. Smith 450 [Herb. Hort. Then. I.6254] (Br, Cm, N, N, S, Vt, W--532973). Santander: Araque Molina & Barkley 18S318 (N). Santander do Norte: Schlim 274 [Macbride photos 24657] (Br, Br, F--photo, Kr--photo, Kr--photo, N, N--photo, Si--photo, Z--photo). Department undetermined: Collector undesignated 199 (F--1337816); F. C. Lehmann 7914 [in Colombia et Ecuador collectae] (W--1323012). ECUADOR: Guayas: Asplund 7685 (S), 15879 (S). El Oro: Asplund 15733 (S), 15752 (S). PERU: Cajamarca: Sandeman 4131 (K). Department undetermined: Ruíz 4783 [Peruvia et Chili] (W--249771). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 98 (Q); Herb. Bot. Mus. Lund. s.n. [ex America meridionali] (Lu); Karsten s.n. [Diballa, Rio Hacha] (V).

LIPPIA AMERICANA f. HYPTOIDES (Benth.) Moldenke, Phytologia 4: 292. 1953.

Synonymy: Lippia hyptoides Benth., Pl. Hartw. 122. 1843. Lippia guayaquilensis Turcz., Bull. Soc. Nat. Mosc. 36 (2): 202. 1863.

Bibliography: Benth., Pl. Hartw. 122. 1843; Turcz., Bull. Soc. Nat. Mosc. 36 (2): 202. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 95. 1942; Moldenke, Phytologia 2: 385. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 70 & 190. 1949; Moldenke, Biol. Abstr. 27: 3121. 1953; Moldenke, Phytologia 4: 267 & 292 (1953) and 5: 24. 1954; Moldenke, Résumé 80, 81, 84, 313, 460, & 461. 1959; Moldenke, Résumé Suppl. 1: 19 & 25. 1959.

This form differs from the typical form of the species in having its branches and branchlets rather densely hispid.

The plant is a shrub or subshrub, 2--3.1 m. tall, or a tree, erect; branches and branchlets pilose-hispid or hispid, the branches terete or obscurely tetragonal, with sparse and spreading white hispid hairs above; leaves decussate-opposite, ovate-lanceolate or ovate, 7.5--8.7 cm. long, firmly membranous, green on both surfaces, short-petiolate, acuminate at the apex, serrate-crenate along the margins, narrowed at the base, scabrous above with short white conic tubercles, some of which end in short white hairs, strigose on the venation beneath, otherwise glabrous

and smooth, "venulae tamen etiam minores pilis nonnullis hinc inde hirsutae", the upper leaves among the inflorescences smaller, gradually passing into small lanceolate bracts; flowering portion of the branches 6--12 inches long; peduncles 4—6 mm. long, often 3 in each leaf-axil, one-headed; spikes subglobose, short-pedunculate, whorled, aggregate in leafy inflorescences, 6 mm. in diameter, very densely imbricate, many-flowered; bractlets broadly obovate-cuneate, obtuse and puberulent at the apex; calyx conspicuously compressed, puberulent on the outside, long-ciliate with dense white and stiff distichous hairs on the keel, bilobed at the apex, the lobes carinate and acute; corolla white, half again as long as the calyx, the throat dilated, the upper lip abbreviated and emarginate, the lower twice as long and trifid; fruiting-calyx subcoherent with the 2-parted fruit; nutlets included by the dry pericarp, spontaneously splitting at maturity.

The type of this form was collected by Carl Theodor Hartweg (no. 686) in woods near Guayaquil, Guayas, Ecuador, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The type of L. guayaquilensis was gathered by William Jameson (no. 890) in the "cerrito" of Guayaquil in May of 1845. Turczaninow describes his plant as follows: "Lippia ramis obtuse tetragonis sparse pilosis; foliis oppositis ternisve lanceolatis, utrinque attenuatis acuminatis integerrimis aut sub apice serraturis 1—2 parum conspicuis munitis, supra punctulatis, subtus ad nervationes tantum pilosulis; capitulis axillaribus pedunculatis 4--6 globosis petiolum subaequantibus; bracteis trapezoideis longitudine florum; calycibus dorso bicarinatis; carinis longe ciliatis; corollae tubo brevi calycem excedente; coccis maturitate secedentibus. Lippia asperrifoliae Rich. affinis; at folia vulgo majora integerrima aut vix serrulata."

The form has been collected in river valleys, at altitudes from sea-level to 2200 meters, flowering in March, May, and June, fruiting in May. Bentham says "Species pluribus notis L. lasiocalycinae Cha. et Schl. affinis." Weberbauer 6346 shows the leaves more deeply and closely toothed than usual.

Material has been misidentified and distributed in herbaria under the names L. americana L., L. alba (Mill.) N. E. Br., L. hemisphaerica Jacq., and Lantana sp. The subspecific epithet is sometimes uppercased.

In all, 9 herbarium specimens and 1 mounted photograph, including type or phototype material of all the names involved, have been examined by me.

Citations: ECUADOR: Guayas: N. J. Andersson 83 (N, S, S, S); Hartweg 686 (N--isotype); A. S. Hitchcock 20111 (N, W--1195152); Jameson 390 (W--1544549), 890 (Z--photo). PUNA ISLAND: Eggers 14739 (W--1322867). PERU: Piura: Ellenberg 1493 (Ut--115373b); Weberbauer 6013 (W--1497159), 6346 (W--1495459).

LIPPIA AMERICANA f. PILOSA Moldenke, Phytologia 4: 292. 1953.

Bibliography: Moldenke, Phytologia 4: 266, 267, & 292. 1953;

Moldenke, Biol. Abstr. 27: 3121. 1953; Moldenke, Résumé 67, 80, & 460. 1959.

This form differs from the typical form of the species in having its young branches conspicuously long-pilose, the hairs mostly appressed.

The plant is an erect herb, 1—1.6 m. tall, woody below, or a spreading shrub to 4 m. tall, with white, greenish-white, or cream-colored flowers.

The type of the form was collected by Ellsworth Paine Killip, Armando Dugand G., and Roberto Jaramillo Mejía (no. 38334) in a deep wooded canyon, at 380—600 meters altitude, Quebrada Cabaña, Hacienda El Cucharo, between Tocaima and Pubenza, Cundinamarca, Colombia, on May 8, 1944, and is deposited in the Britton Herbarium at the New York Botanical Garden.

Common names recorded for the plant are "belíta" and "mano de Dios". Collectors often say "heads white" or "inflorescence white", but certainly are referring here only to the color of the corollas. Pittier refers to the flowers as "greenish-white", while Asplund describes them as "cream". The plant has been found in thickets, along trails, at the edge of woods, and in deep wooded canyons, at altitudes of 30 to 1075 meters, flowering in May, July, August, and November to January, fruiting in January, May, and November. Killip & Smith 14342 is conspicuously pilose!

Herbarium material has been misidentified and distributed in herbaria under the names L. americana L., L. hemisphaerica Jacq., and L. hemispherica Cham. In all, 15 herbarium specimens, including the type, have been examined by me.

Citations: COLOMBIA: Atlántico: Elias 873 (W—1543601). Bolívar: Killip & Smith 14238 (N, W—1350230), 14342 (N, W—1350336), 14518 (W—1350505). Cundinamarca: Killip, Dugand, & Jaramillo 38334 (N—type). Méta: F. R. Fosberg 19396 (W—2059691). Department undetermined: Heriberto 451 (W—1067132). VENEZUELA: Zulia: H. Pittier 10541 (N, Ve—10784, W—1187218). ECUADOR: Guayas: Asplund 7685 (W—1931119); Holway & Holway 807 (N); Schimpff 1124 (W—1619533).

LIPPIA ANGUSTIFOLIA Cham., Linnaea 7: 377. 1832 [not L. angustifolia Morong, 1904].

Synonymy: Lippia graminifolia Kuntze, Rev. Gen. Pl. 3 (2): 253, in textu. 1898. Lippia angustifolia Cham. & Schlecht. ex Moldenke, Alph. List Invalid Names Suppl. 1: 13, in syn. 1947. Lippia angustifolia H.B.K. ex Moldenke, Alph. List Invalid Names Suppl. 1: 13, in syn. 1947. Riedelia angustifolia Cham. ex Moldenke, Alph. List Invalid Names Suppl. 1: 19, in syn. 1947. Lippia angustifolia Schau. ex Moldenke, Résumé 310, in syn. 1959.

Bibliography: Cham., Linnaea 7: 377. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; Walp., Repert. Bot. Syst. 4: 44. 1845; Schau. in A. DC., Prodr. 11: 588. 1847; Schau. in Mart., Fl. Bras. 9: 242. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 99. 1877;

Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 196. 1892; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Briq. in Chod., Bull. Herb. Boiss., sér. 2, 2: 819. 1902; Briq. in Chod., Pl. Hassler. 1 (9): 198. 1902; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 498. 1904; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 314. 1904; Herter, Flórula 104. 1930; Moldenke, Lilloa 5: 419 & 424. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 41, 43, & 95. 1942; Moldenke, Alph. List Cit. 1: 170, 201, & 264. 1946; Augusto, Fl. Rio Grande do Sul 235. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 13 & 19. 1947; Moldenke, Lilloa 14: 40. 1948; Moldenke, Phytologia 2: 481. 1948; Moldenke, Alph. List Cit. 2: 444, 485, & 598 (1948), 3: 689, 751, 772, 846, 847, 856, 922, & 923 (1949), and 4: 1124, 1250, & 1257. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 99, 104, & 189. 1949; Moldenke, Phytologia 3: 376. 1950; Stellfeld, Trib. Farmac. 19 (10): 168. 1951; Angely, Fl. Paran. 7: 12. 1957; Moldenke, Résumé 93, 116, 125, 310, 343, & 460. 1959; Angely, Fl. Paran. 16: 59 (1960) and 17: 46. 1961; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Troncoso, Darwiniana 12: 258, 259, 286, 287, & 289, fig. 15. 1961; Moldenke, Résumé Suppl. 8: 4. 1964.

Illustrations: Troncoso, Darwiniana 12: 286, fig. 15. 1961.

Shrub or subshrub, 1—2 m. tall; stems suffruticose, lignescent below, slender, strict, virgate, angular, strigillose above, simple or racemose-branched at the apex; branches few; lower internodes elongate, slightly shorter than the subtending leaves; leaves decussate-opposite, sessile, the blades lanceolate, 5--6.3 cm. long and 8--10 mm. wide or larger and elongate to 10 cm., acute at the apex, serrate with a few acute spreading teeth toward the apex, cartilaginous and subrevolute along the margins, lineate above, sparsely strigillose on both surfaces with short often callose-based setae, the floral leaves shorter and linear-lanceolate; midrib stout, the laterals prominulous beneath or obsolete, rarely conspicuous; inflorescence leafless, terminal, long-pedunculate; peduncles slender or filiform, elongate; heads small, about 6 mm. wide, globose, a few at the apex of the stems or branches, dense, racemose, elongating in age to 12.5 mm.; bractlets ovate, cuspidate-acuminate at the apex, strigose-canescent on the back, closely imbricate, shorter than the corolla; flowers dioecious; calyx very small, bifid, villous; corolla yellow, infundibular, about 3 mm. long, pubescent outside toward the apex, the lowest lobe of the limb expanded, subcordate, and acuminate; fruit obcordate-subglobose, adhering for half its length to the diphyllous fruiting-calyx, easily splitting; cocci dark and subnitid on the back, the commissural surface oblique and whitish.

This species is based on several collections made by Friedrich Sellow "in montibus Serra da Lappa dictis ad praedia Baixis et Viardem", in Minas Gerais, Brazil, in September, and deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed, but where one was photographed by Macbride as his photograph number 17495. Lippia angustifolia Cham. & Schlecht. is based on Du-

sén 2334 and L. angustifolia Schau. on Dusén 1236a, both from Paraná, Brazil, and deposited in the United States National Herbarium at Washington, but are mere misaccreditions; L. angustifolia H.B.K., another misaccredition, is based on Dusén 11365 from a rather marshy campo at Desiro Ribas, Paraná, collected on February 17, 1911, and deposited at Stockholm. The name, L. angustifolia Morong, belongs in the synonymy of L. morongii Kuntze.

Lippia angustifolia has been found on campos, wet campos, and rather marshy campos, open moist banks and riverbanks, in swamps and shrubby marshes, dry grasslands, and almost marshy thickets, at 800 meters altitude, flowering from September to April. Schauer (1847) places it in his Section Zapania, Subsection Paniculatae. He cites Riedel s.n. and Lund s.n. from "in agro Sorocabensi, Decembri-Martio", São Paulo, and Sellow s.n. and Pohl s.n. from "ad fluvios Taboca et Paracatu" in Minas Gerais. Hiern (1877) also cites Lund s.n. from Sorocaba.

Troncoso (1961) places the species in her Subgenus Lippia, Section Lippia, Series Paniculatae. She reduces L. bothrioura Briq. to synonymy here and says "Establezco esta sinonomia basándome en el ejemplar Dusén 11365 del Brasil, determinado como L. angustifolia Cham. y que se halla en el Herbario de Kew. Un duplicado del mismo se encuentra en el Darwinion y coincida exactamente con la descripción de Chamisso. Especie dioica. Los ejemplares examinados, Hassler 7471 y Dusén 11365, son ♀, en cambio Rodriguez 129 posee pies ♂ et ♀. He podido así dibujar los dos sexos. Chamisso en la descripción de su especie, describe detalladamente los estambres, en cambio no ha visto fruto, lo que me hace pensar que su ejemplar era ♂. Lippia angustifolia pertenece junto con L. scaposa Briq. a la serie Paniculatae (Sch.) Briq. caracterizada por inflorescencias terminales en cabezuelas hemisféricas más o menos racimosas o cimoso raimosas." She cites: BRAZIL: Paraná: Dusén 11365 (K, Si). PARAGUAY: Hassler 7471 (Cb); T. Rojas 3627 (Si). ARGENTINA: Misiones: Burkart 14149 (Si); F. M. Rodriguez 129 (Si). I am, however, maintaining Briquet's taxon -- of which Hassler 7471 is the type collection -- as distinct, at least for the time being

The Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 196 (1892) reference cited in the bibliography above is sometimes cited by other workers as "Morong, Paraguay (1892) 196" or is dated "1893", and Briq. in Chod., Pl. Hassler. 1 (9): 198 (1902) is sometimes cited as "Plantae Hasslerianae IX (1902) 198."

Herbarium material of L. angustifolia has been misidentified and distributed in herbaria under the names L. hieraciifolia Cham., Lantana sp., and Verbena sp. On the other hand, the Morong 860, distributed as L. angustifolia, is actually L. morongii Kuntze.

In all, 43 herbarium specimens and 5 mounted photographs, including type material of all the names involved, have been exam-

ined by me.

Citations: BRAZIL: Minas Gerais: Mosén 970 (S, S); Regnell III.947 [Uberava, Nov. 29, 1848] (S, W--201129), III.947 [Caldas, Jan. 7, 1868] (N, S), 947b (S); Sellow s.n. [Brasilia merid.; Macbride photos 17495] (Kr--photo of cotype, N--photo of cotype, N--photo of cotype, Vt--cotype); Widgren 1233 (Br), s.n. [1845] (N, S, W--1322884). Paraná: Dusén 1236a (N, W--1481652), 2434 [Herb. Rio de Jan. 14860] (N, S, W--1199428), 11365 (S); Hatschbach 661 [Rambo 36858] (N, Rb); G. Jönsson 1236a (S), 1333a (S). Rio Grande do Sul: Rambo 25780 (Rb). São Paulo: Riedel & Lund 2074 (N). State undetermined: Herb. Rio de Jan. 32216 (Ja). PARAGUAY: Fiebrig 4684 (Cb, Cb, N, N, N--photo, Z--photo); Hassler 9117 (V), 7971 (N, V--564); Pedersen 4325 (N, W--2283773). ARGENTINA: Corrientes: Ibarrola 3956 (N, S). Misiones: Ekman 2010 (Mi, N), 2011 (S), 2012 (N, S); Grtner 743 [Herb. Osten 23193] (Ug); Niederlein s.n. [Herb. Mus. Nac. Hist. Nat. Buenos Aires 23604] (Ra).

LIPPIA ANTAICA Loes. & Moldenke ex Moldenke, Phytologia 2: 19--20. 1941.

Synonymy: Lippia antaica Loes. ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941.

Bibliography: Moldenke, Phytologia 2: 19--20. 1941; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35, 80, & 95. 1942; Moldenke, Alph. List Invalid Names 29. 1942; Moldenke, Alph. List Cit. 1: 325 (1946) and 4: 1113. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73 & 189. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 84, 310, & 460. 1959.

Shrub, to 1.2 m. tall; Branches slender, apparently strict and virgate, acutely tetragonal, brownish, appressed-puberulent throughout; principal internodes 2--3 cm. long; nodes not anmulate; leaves decussate-opposite, small; petioles very slender, 1--2 mm. long or obsolete, densely short-pubescent; leaf-blades firmly chartaceous or subcoriaceous (when mature), flabelliform or subrotund, obovate when immature, to about 2 cm. long and wide when mature, with numerous smaller thinner and more obovate ones in their axils, rounded at the apex, subtruncate or truncate at the base (the immature and smaller ones acute or subcuneate at the base), regularly and uniformly crenate-serrate from the base to the apex with rounded teeth, the margins revolute, very scabrous and bullate above, puberulent on the venation, densely pubescent over the entire surface beneath; midrib, secondaries, and veinlet reticulation deeply impressed above, the larger parts prominent beneath; inflorescence axillary, a pair at each node, capitate; peduncles very slender, erect, 5--10 mm. long, densely appressed-puberulent with grayish hairs like the branches; heads densely many-flowered, about 8 mm. long and 10 mm. wide; bractlets ovate, 2.5--3 mm. long, subacute at the apex, densely short-pubescent;

corolla 4--5 mm. long, its limb about 3 mm. wide.

The type of this rare species was collected by August Weberbauer (no. 5918) below Limatambo, at an altitude of 2300--2400 meters, Cuzco, Peru, in June, 1911, and is deposited in the herbarium of the Chicago Natural History Museum.

The species has been collected at altitudes of 2100 to 2400 meters, flowering in April and June. In all, 2 herbarium specimens and 2 mounted photographs, including type material of both names involved, have been examined by me.

Citations: PERU: Cuzco: Vargas 9429 (N); Weberbauer 5918 (F--628843--type, N--photo of type, Z--photo of type).

LIPPIA ARECHAVALETAE Moldenke ex Herter, Revist. Sudam. Bot. 4: 185, nom. nud. (1937); Moldenke, Lilloa 5: 420. 1940.

Bibliography: Herter, Revist. Sudam. Bot. 4: 185 (1937) and 6: 97. 1939; Moldenke, Lilloa 5: 420. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 95. 1942; Herter, Revist. Sudam. Bot. 7: 225. 1943; Moldenke, Lilloa 10: 342 & 377. 1944; Moldenke, Alph. List Cit. 1: 12. 1946; Moldenke, Phytologia 2: 336. 1947; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 46. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 49. 1948; Moldenke, Lilloa 14: 40. 1948; Moldenke, Alph. List Cit. 2: 357, 448, 457, & 532 (1948), 3: 780, 875, 876, & 922 (1949), and 4: 1166. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 100, & 189. 1949; Rosengurtt, Lilloa 20: 137, 138, & 174. 1949; Stellfeld, Trib. Farmac. 19 (10): 168. 1951; Moldenke, Phytologia 4: 267. 1953; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Angely, Fl. Paran. 7: 12. 1957; Moldenke, Résumé 93, 116, 119, & 460. 1959; Angely, Fl. Paran. 16: 59 (1960) and 17: 46. 1961; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Moldenke, Résumé Suppl. 10: 4. 1964.

Perennial herb, woody at the base, or low subshrub; stems slender, densely puberulent with very minute appressed hairs and densely strigose with much longer appressed albidous hairs covering the lower puberulence; leaves decussate-opposite, sessile, numerous, the blades firmly chartaceous, rather thick and stiff, elliptic, 5.5--20 mm. long (or the lowest still more reduced), 2--8 mm. wide, acute at the apex, entire, often slightly subrevolute along the margins, obtuse or rounded at the base, rather sparsely strigillose and also puberulent above, more densely puberulent on the lamina beneath and strigose on the venation; secondaries numerous, subparallel, ascending, almost straight, impressed above; inflorescence axillary, abundant, solitary in each axil, decussate-opposite, erect, 1--3.5 cm. long, surpassing the subtending leaves; peduncles very slender, 0.6--2.6 cm. long, puberulent and strigose; bractlets densely glandular-pubescent; flowers dioecious; corolla yellow or golden-yellow to orange or "yellow and red".

The type of this distinctive species was collected by José Arechavaleta (no. 11) — in whose honor it was named — at Salto, Tacuarembo, Uruguay, in November and December, 1898, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin

Botaniques at Geneva. The species has been collected in rocky pastures, arroyos, and dry clearings, on rocky hills, between stones and shrubbery, and on campos, at altitudes of 500 to 1026 meters, flowering from September to February. Rosengurtt calls it "rare" at Paysandú and describes it as "subarbusto bajo, de lugares protegidos contra el ganado, como pedregales y bosques."

The flowers are described as "yellow and red" or "orange, yellow, and red" on Rosengurtt B.3921, "golden-yellow" on Herter 60165, and "yellow" on Berro 3007, 3008, 5786, & 7480, Hatschbach 3370, Herb. Osten 3756, and Smith & Klein 11485.

Herbarium material of this species has been misidentified and distributed in herbaria under the names L. pseudo-thea Schau. and Verbena arechavaletae Osten. A note on Osten 3255 reads "cf. L. intermedia Cham. sed flor. axillares".

In all, 27 herbarium specimens and 2 mounted photographs, including the type, have been examined by me.

Citations: BRAZIL: Paraná: Hatschbach 3370 (Z); Hertel 6 [Herb. Mus. Paran. 1960] (Mp). Santa Catarina: Smith & Klein 11485 (W—2249377); Smith, Reitz, & Sufridini 9278 (W—2249358). State undetermined: Sellow s.n. [Brasilia] (Vt). PARAGUAY: Fiebrig 6493 (W—1159378). URUGUAY: Arechavaleta 11 [Briquet 23] (Cb—type, Cb—isotype, N—isotype, N—photo of type, Ug—isotype, Ug—isotype, Ug—isotype, Z—photo of type), s.n. [Herb. Osten 3756] (Ug); Berro 3007 (N), 3008 (N), 5786 (N), 7480 (N), 7481 (N); Chebataroff s.n. [San Javier, Jan. 1939] (Ug—4697); Collector undesignated s.n. [Arenales de San Javier, near the Rio Uruguay, Feb. 1940] (Ug—5866); Herter 60165 (N); Osten 3255 (Ug); Rosengurtt B.3252 (N), B.3921 (N, N, Si). ARGENTINA: Entre Ríos: Herb. Herter 4481 (N).

LIPPIA ARECHAVALETAE var. MICROPHYLLA Moldenke, Lloydia 13: 223. 1950.

Bibliography: Moldenke, Lloydia 13: 223. 1950; Moldenke, Phytologia 3: 376. 1950; Moldenke, Résumé 93 & 461. 1959.

This variety differs from the typical form of the species in having its leaves uniformly smaller, oblong-elliptic, 6—13 mm. long, 2.5—7 mm. wide, imbricate, entire, and very slightly subrevolute along the margins.

The type of the variety was collected by Padre Balduino Rambo (no. 2751) in dry thickets at Morro dos Bois near São Leopoldo, Rio Grande do Sul, Brazil, on September 9, 1936, and is deposited in the herbarium of the Colegio Anchieta at Porto Alegre, Brazil. Thus far the taxon is known only from the type collection. In all, 2 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Rio Grande do Sul: Rambo 2751 (E—photo of type, F—photo of type, N—isotype, N—photo of type, Rb—type, Z—photo of type).

LIPPIA ASPERRIMA Cham., Linnaea 7: 215--217. 1832.

Synonymy: Lippia asperrima var. asperrima Moldenke, Résumé 310, in syn. 1959.

Bibliography: Cham., Linnaea 7: 215--217. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 597. 1843; Walp., Repert. Bot. Syst. 4: 45. 1845; Schau. in A. DC., Prodr. 11: 581. 1847; Morren, Belg. Hort. 1: 154. 1851; Schau. in Mart., Fl. Bras. 9: 232. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 98. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 311 & 313. 1904; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1157. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 493. 1904; T. Herzog, Meded. Rijksherb. Leiden 29: 44. 1916; Gallinal, Bergalli, Campal, Aragone, & Rosengurtt, Stud. Nat. Mead. Urug. 81. 1938; Moldenke, Lilloa 5: 420--421. 1940; Ragonese, Darwiniana 5: 413. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 40, 41, 43, & 95. 1942; Herter, Revist. Sudam. Bot. 7: 225. 1943; Rosengurtt, Estud. Prad. Nat. Urug. 3: 235. 1943; Moldenke, Lilloa 10: 342 (1944) and 12: 148. 1946; Moldenke, Alph. List Cit. 1: 12, 27, 39, 51, 95, 201, 263, & 264. 1946; Moldenke, Phytologia 2: 385 & 386 (1947) and 2: 481. 1948; Moldenke, Lilloa 14: 40--41, 43, 44, & 48. 1948; Moldenke, Alph. List Cit. 2: 376, 381, 384, 440, 441, 444, 458, 585, 587, 598--600, 627, & 628 (1948), 3: 705, 732, 733, 745, 781, 857, 875, 910, 911, 913, & 967 (1949), and 4: 1088, 1089, 1091, 1165, 1237, 1256, 1257, & 1302. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 97, 99, 100, 104, & 189. 1949; Rosengurtt, Lilloa 20: 132, 137, & 174. 1949; Moldenke, Phytologia 3: 290. 1950; Stellfeld, Trib. Farmac. 19 (10): 168. 1951; Moldenke, Inform. Mold. Set 49 Spec. 2. 1954; Moldenke, Phytologia 5: 96. 1954; Angely, Fl. Paran. 7: 12. 1957; Moldenke, Résumé 93, 114, 116, 119, 125, 310, & 461. 1959; Angely, Fl. Paran. 16: 59 (1960) and 17: 46. 1961; Troncoso, Darwiniana 12: 259. 1961.

Perennial glutinous herb, often rough, creeping and suffrutescent, or bush, subshrub, or shrub, 0.3--1 m. tall, with a woody xylopodium; roots woody, thick; stems herbaceous above, erect, fastigiate, subtetragonal, glandular-hirtellous and viscid, the hairs short, patent, rather rigid, and glanduliferous; principal internodes subequaling or shorter than the leaves; leaves decussate-opposite, rather rigid, green, subsessile, oblong-lanceolate, 2.5--7.5 cm. long, 1.2--2.5 or more cm. wide, acute at the apex, coarsely crenate-serrate with obtuse teeth, impressed-penninerved, strigose and very rough above and on the larger veins beneath, often sticky, the larger venation prominent beneath, impressed above; peduncles filiform, axillary, shorter than the subtending leaves; heads subglobose, involucrate, 8--10 mm. wide, convex during anthesis, many-flowered, ovoid in fruit; bractlets ovate, acuminate at the apex, loosely imbricate, half equaling the head in involucrate fashion at the base, subequaling the corolla-tube, strigose; calyx very short-pubescent; corolla hypocrateriform, varying from yellow, clear-yellow, or yellow-orange, to rosy-yellow, orange, or "yellow and red", the tube villosulous at the apex, the limb vil-

losulous on the back, very finely glistening hairy above, unequally 4-fid, the lobes short, truncate-obtuse, the throat villosulous; fruit hidden among the equally long bractlets, pubescent, easily splitting into often unequal nutlets.

The type of this common species was collected by Friedrich Sellow "e Brasilia tropica" and was deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed. Schauer (1847) places the species in his Section Zapania, Subsection Axilliflorae. It has been collected in fields, grassy or brushy places, low wet ground or wet places, light woods, pastures, grassy clearings, cultivated soil, and dry barren scrubland, at the edge of woods, and on rocky and grassy slopes, campos and dry grassy campos, dry plains, and steppes, at altitudes of 216 to 1500 meters, flowering from August to March. Morel describes it as a "rare plant" in Formosa, but Jörgensen tells us that it is extremely common or "abundant" on the campos at Villa Rica and at Las Palmas. Rosengurtt calls it "rare" in fields at Paysandú. He also describes it (1943) as "Hierba hemicriptófita, florece a fines de primavera y en verano. Habita campos vírgenes poco pastoreados, prefiriendo los lugares abonados, alrededor de cuevas de animales salvajes, nidos, dormideros, etc. Es escasa." He found it to be frequent on rocky and grassy slopes at Arroyo Tres Arboles. In his 1949 work he says of it "campestre escasa, principalmente en pedregales!

A. G. Schulz says about his no. 8689: "flor amarilla, luego anaranjada y finalmente rojiza. Hay muchas flores sin caliz; otras con un solo sépalo y otras las más escasas, con 2 sépalos libres" and "bosquecillos ralos en suelo arcilloso, duro; flor amarillo; luego anaranjado y rojizo; caliz de sépalos libres, muchos flores sin caliz." For his no. 8692 he says: "Flores amarillas; pasada la antesis son anaranjadas y luego rojizas" and "bosquecillos ralos; suelo arcilloso-calcares; flor amarillo, luego anaranjado y rojizo; caliz grande, entero." Venturi 2432 has the leaves extra long and narrow.

For horticulturists, interested in color variants, the following are the corolla colors as given by various collectors: "clear-yellow" — Hassler 2403; "rosy-yellow" — A. G. Schulz 2916; "orange" — Hassler 6348; "yellow-orange" -- Anisits 2252; "yellow and red" — Venturi 2432; and "yellow" — R. M. Aguilar 468, Berro 1968, Burkart 4149, Herb. Osten 12177 & 20647, W. Hoehne 2662, Ibarrola 1300, 3233, & 4348, Job 1643, Jörgensen 2631 & 3775, Kuntze s.n. [Jujuy, Oct. 1892], Malme s.n. [Las Palmasco, 20/3/1903], T. Meyer 3452, Moldenke & Moldenke 19747, Osorio s.n. [Valle Eden, Feb. 18, 1947] & s.n. [Cerro Tobatinga, Feb. 24, 1947], Osten 6565, 7198, 9179, & 9180, Rambo 3040, Rosengurtt B.3002, Schreiter 5062 & s.n. [Muñecas, Nov. 15, 1917], C. L. Schulz 1010, Sparre 1238, Terribile 381, Venturi 7359, and J. West 6285.

The Ragonese, Darwiniana 5: 413 (1941) reference in the bibliography above is sometimes cited as "Ragonese, Santa Fe (1941) 412"; T. Herzog, Meded. Rijksherb. Leiden 29: 44 (1916) is sometimes ci-

ted as "Herzog, Bolivia III (1916) 44"; and Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 493 (1904) is often cited as "Plantae Hasslerianae XI (1904) 493". The label on D'Orbigny 1146 was originally inscribed "Peru", but this was later crossed out.

Briquet (1904) compares his L. trachyphylla with the present species as follows: "Espèce très caracterisée, voisine du L. asperrima Cham. dont elle diffère par ses feuilles ovées et petiolées, ses tiges rampantes diffusement rameuses, ses pédoncules plus courts, a indument strigoso-applique à glandes stipitées très courtes et localisées sous les capitules, ses corolles d'un rose-violace (jaunes dans le L. asperrima) etc."

Herbarium material of L. asperrima has been misidentified and distributed in herbaria under the names L. asperifolia Rich., "L. aff. asperrima Cham.", L. imbricata Kuntze, L. recolletae Morong, L. reptans Kunth, L. turnerifolia Cham., L. turnerifolia Cham. & Schlecht., L. turnerifolia var. camporum Griseb., and even Mimosa bimucronata var. hexandra (the last-mentioned probably a case of label-crossing). On the other hand, Venturi 531, 1375, & 7359, distributed as L. asperrima, are L. contermina Briq.; Herb. Osten 18188, Herb. Mus. Argent. Cient. Nat. 16278, D. Rodriguez 409, T. Rojas 2541, and Rosengurtt B.3383 are L. morongii Kuntze; and Herb. Inst. Bot. S. Paulo 23346 and F. C. Hoehne s.n. [Villa Velha, Ponta Grossa, Nov. 3, 1928] are L. pumila Cham.

Schauer (1851) cites Riedel s.n. and Sellow s.n. from "In prov. S. Pauli et Matto Grosso pascuis humilis e. gr. pr. Camapuan, Novembri." Ragonese (1941) cites his no. 2630 and no. 4470 from Santa Fé, Argentina, while Rosengurtt (1949) cites his B.3383 — the last-mentioned, however, is actually L. morongii. Troncoso (1961) cites Hassler 7456 as this species, even though Briquet (1904) had regarded it as a cotype of his L. phaeocephala, which Troncoso maintains that it is not.

In all, 151 herbarium specimens and 2 mounted photographs of L. asperrima have been examined by me.

Citations: BRAZIL: Paraná: Jönsson 35a (S). Rio Grande do Sul: Bornmüller 206 (C, Cb, V—6631); Osorio s.n. [Cerro Tobatinga, Feb. 24, 1947] (Ug—144141); Rambo 3040 (Rb); Swallen 7687 (W—1933118). São Paulo: W. Hoehne 2662 (Bh, N). BOLIVIA: Cochabamba: M. Cárdenas 5292 (W—2250812). Santa Cruz: Steinbach 2712 (N, Ra—33057). Province undetermined: D'Orbigny 1146 [Herb. Reichenb. f. 127452] (N). PARAGUAY: Anisits 1925 (S), 2252 (S); Fiebrig 4777 (Cb); Hassler 6348 (Ca—944337, N, S), 9312 (N, N—photo, V, Z—photo), 11590 (Ca—930254, Go, N, S, W—1056991); Jörgensen 3775 [Herb. Osten 22239] (Du—197835, N, S, Ug, W—1483630), s.n. [Herb. Mus. Argent. Cienc. Nat. 28/2067] (N); Kuntze s.n. [Süd Paraguay, IX. 92] (N); Osten 9178 (Ug), 9179 (S), 9180 [Herb. Osten 9012] (S), 9182 (Ug); T. Rojas 12967 (N, Ur), s.n. [San Bernardino; Hassler

2403; Herb. Hicken 21; Herb. Osten 7539] (Ug). URUGUAY: Arechavaleta 14 (Cb), 15 (Ug), 16 (Cb, Ug), 17 (Cb, Cb, Ug, Ug); H. H. Bartlett 21030 (W--2320218); Berro 1968 (N); Gallinal, Aragone, Bergalli, Campal, & Rosengurtt 1953 (W--1742785); Legrand 2007 (Ug), 2011 (Ug), 2569 (Ug); Osorio s.n. [Valle Eden, Feb. 18, 1947] (Ug--13839); Osten 3321 (Ug), 6565 (Ug); Rosengurtt B.2356 (N), B.3002 (N); Rosengurtt & Gallinal 5730 (Sp--54241); Schröder s.n. [Santa Ysabel; Herb. Osten 16592] (Ug). ARGENTINA: Chaco: R. M. Aguilar 468 (N); Jörgensen 2631, in part [Herb. Inst. Miguel Lillo 32173; Herb. Osten 11918] (N, Ug); Malme s.n. [Las Palmas, 20/3/1903] (S); T. Meyer 2674 (N); A. G. Schulz 1497 (N), 2916 (N), 8689 (Cb, Hk), 8692 (Cb, Hk); C. L. Schulz 1010 (N); Venturi 36 (W--1043610). Corrientes: Ibarrola 1300 (S), 3217 (N), 3233 (N), 3883 (N), 4348 (N, S). Entre Ríos: Burkart 4149 [Herb. Osten 22468] (Ug). Formosa: Jörgensen 2631, in part [Herb. Osten 13679] (Ug); I. Morel 96 (N), 559 (N, S), 785 (N), 834 (N), 1137 (N), 1288 (N, Vi). Jujuy: E. K. Balls B.5931 (Ca--683618); Kuntze s.n. [Jujuy, Oct. 1892] (N, W--701569); Moldenke & Moldenke 18748 (N); J. West 6285 (Ca--561723). Misiones: Bertoni 1491 (Ca); Ekman 1997 (N, S), 2013 (S); Grüner 701 [Herb. Osten 23168] (Ug); Montes 225 (S), 1088 (N, Ur); G. J. Schwarz 783 (Ca); Vattuone & Bianchi L.28 (W--1043492). Salta: Job 1543 (N); T. Meyer 3452 [Herb. Inst. Miguel Lillo 35569] (En, N); Moldenke & Moldenke 19747 (Es, Lg, N, Sm); O'Donell 4648 (N); Pierotti 219 (N), 1131 (Ca); A. Ringuelet 115 (N); J. T. Roig 15427 (Es); Schreiter 5062 [Herb. Osten 20647] (Ug), s.n. [Cerro San Lorenzo, Oct. 18, 1925; Herb. Mus. Argent. Cienc. Nat. 26/1342] (N); A. G. Schulz 6575 (Z); Sparre 1176 (S), 1238 (S); Wall & Sparre s.n. [4/12/46] (Ew), s.n. [5/12/46] (Ew, Ew, Ew). Santa Fé: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 19614] (N); Feddersen s.n. [Aurelia, near S. Fé] (Cp); Job 801 (N); Kuntze s.n. [Ceres, X.92] (N); Ruíz Leal 14245 (Rl); Terribile 381 (N), 422 (N). Tucumán: Barkley & García 128 (N); Moldenke & Moldenke 19716 (N), 19755 (Es, Es, Lg, N); Monetti 1138 [Herb. Inst. Miguel Lillo 32176] (N); Ruíz Leal 12157 (Rl); Schreiter s.n. [Muñecas, Nov. 15, 1917] (Ug), s.n. [Muñecas, Dec. 16, 1923; Herb. Inst. Miguel Lillo 37994] (N, Ug--4944); Venturi 2432 [Herb. Osten 17235] (Ug, W--1591257, W--1591258), 2627 (Ra--24/129, W--1591261), 3614 (W--1591277); Wall & Sparre s.n. [20/11/46] (Ew), s.n. [24/11/46] (Ew).

LIPPIA ASPERRIMA var. LONGIPEDUNCULATA Moldenke, Lilloa 5: 421. 1940.

Bibliography: Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Moldenke, Lilloa 5: 421 & 423 (1940) and 8: 424. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 40, 41, 43, & 95. 1942; Herter, Revist. Sudam. Bot. 7: 225.

1943; Rosengurtt, Estud. Prad. Nat. Urug. 3: 235. 1943; Moldenke, Lilloa 10: 378. 1944; Moldenke, Holmbergia 4: 150. 1945; Moldenke, Alph. List Cit. 1: 12, 96, 218, & 219. 1946; Moldenke, Alph. List Invalid Names 13. 1947; Moldenke, Phytologia 2: 386. 1947; Moldenke, Lilloa 14: 43. 1948; Moldenke, Alph. List Cit. 2: 629 (1948), 3: 689, 693, 859, 874--876, & 913 (1949), and 4: 1165 & 1166. 1949; Moldenke, Phytologia 3: 74. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 97, 99, 100, 104, & 190. 1949; Rosengurtt, Lilloa 20: 131, 137, & 174. 1949; Moldenke, Résumé 93, 114, 116, 119, 125, 310, & 461. 1959; Moldenke, Résumé 10: 3--5. 1964.

This variety differs from the typical form of the species in that its peduncles far exceed the leaves during anthesis, being 4.5--11.5 cm. in length. The plant is an herb, 5--20 cm. tall; branchlets and peduncles finely glandular-puberulent, strigose with white appressed hairs; leaf-blades cuneiform, 1.1--4 cm. long, 0.8--1.8 cm. wide, acute at the apex, cuneate at the base, coarsely serrate with large triangular and acute teeth from the middle to the apex, strigose with white appressed hairs on the upper surface; corolla yellow, yellow with red spots, or orange.

The type of this variety was collected by José Arechavaleta (no. 12) at Salto, Uruguay, in September, 1898, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva.

The bibliography of this taxon is inextricably mixed with that of L. imbricata Kuntze, with which this plant was for a long time confused. Recent examination of Kuntze's type, however, deposited in the Britton Herbarium at the New York Botanical Garden and collected by Carl Ernst Otto Kuntze on March 20, 1892, at Parotani, Bolivia, at an altitude of 2400 meters, and photographed by Macbride as his type photograph no. 17516, has convinced me that it is conspecific with the widespread Lantana achyranthifolia Desf.

On the other hand, the specimens cited as Lippia imbricata in Lilloa 5: 423 (1940), 10: 378 (1944), and 20: 174 (1949), and Holmbergia 4: 150 (1945), and in my Alph. List Cit. [see bibliography, above] -- with the exception of the Kuntze collection -- are either Lippia asperrima var. longipedunculata Moldenke or L. villafloridana Kuntze. The Herb. Inst. S. Paulo 54241 and Rosengurtt & Gallinal 5730, distributed and cited as L. imbricata, are typical L. asperrima Cham. The Arechavaleta 15, distributed and cited by me in my Alph. List Cit. 1: 12 (1946), is actually L. morongii Kuntze. The Castellanos s.n. [Florida, 2.XI.1946; Herb. Inst. Miguel Lillo 15773], s.n. [Artigas, 30.I.1948; Herb. Inst. Miguel Lillo 15764], & s.n. [Santa Ana do Livramento, 24.II.1947; Herb. Inst. Miguel Lillo 15763], Gallinal, Aragone, Bergalli, Campal, & Rosengurtt PE.5171, Legrand 3489, and Rosengurtt B.4581, distributed and cited by me as L. imbricata, are all L. villafloridana.

The variety has been found on dry rocky sunny campos, in spiny

woods and grassy meadows, in fields, and adventive especially along roadsides, at altitudes of 60--80 meters, flowering in April, September, and November to January, fruiting in November and December. Rosengurtt says of it "campestre, frecuente en pedregales", "frecuente en los campos, sobre las márgenes del Río Uruguay", "en los campos rocosos", "sobre las lomas arenosas cubiertas de pasto a lo largo del Río Yi", "común en prados matas crytófitas", and "frecuente en laderas". Schulz says for his no. 1499 "planta abundante; pelos no glandulosos; terrenos arcillosohalófilos, duros y secos." The corolla is described as "orange" on A. G. Schulz 1499, as "yellow with red spots" on Rosengurtt B.2254, and as "yellow" on Anisits 1876, Rodrigo 604, and Rosengurtt B.4210.

The Rosengurtt, Estud. Prad. Nat. Urug. 3: 235 (1943), cited in the bibliography above, is sometimes cited as "Rosengurtt, Flora de Palleros (1943) 235."

Herbarium material has been misidentified and distributed in herbaria under the names L. imbricata Kuntze, L. turnerifolia Cham., and "Phyla nodiflora var." On the other hand, Arechavaleta 15, distributed as L. asperrima var. longipedunculata, is actually L. morongii Kuntze.

In all, 17 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: PARAGUAY: Anisits 1876 (S). URUGUAY: Arechavaleta 12 (Cb--type, Cb--isotype, N--isotype, N--photo of isotype, N--photo of type, Ug--isotype, Ug--isotype); Gallinal, Aragone, Bergalli, Campal, & Rosengurtt 1616 (N); Herb. Mus. Hist. Nat. Montev. 5607 (Ug), 5608 (Ug); Herter 2033a [Herb. Herter 50765] (S); Rosengurtt B.2180 (N, N), B.2254 (N), B.4210 (N). ARGENTINA: Chaco: T. Meyer 113 [Herb. Osten 22703] (Ug); A. G. Schulz 1499 (N). Corrientes: A. P. Rodrigo 604 (N).

LIPPIA ASPERRIMA var. ROTUNDATA Moldenke, Phytologia 1: 466--467. 1940.

Bibliography: Moldenke, Phytologia 1: 466--467 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 2: 368 & 552. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; Moldenke, Phytologia 3: 287 & 290. 1950; Stellfeld, Trib. Farmac. 19 (10): 168. 1951; Angely, Fl. Paran. 7: 12. 1957; Moldenke, Résumé 93, 125, & 461. 1959; Angely, Fl. Paran. 16: 60 (1960) and 17: 46. 1961.

This variety differs from the typical form of the species in having its leaf-blades obtuse or rounded at the apex. It is a perennial herb; petioles 1--4 mm. long, margined; leaf-blades elliptic, 1.8--3.7 cm. long, 1.2--2.4 cm. wide, regularly serrate almost to the base with blunt teeth, acute at the base and prolonged into the short petiole; venation decidedly impressed above, only the midrib and secondaries slightly prominulous beneath;

peduncles 3--3.5 cm. long. The branchlets are densely glandular-pubescent with short dark hairs and are also copiously hirsute with white spreading hairs twice as long, less densely so in age. The hairs on the upper surface of the leaves apparently become bulbous-based in age, first along the margins of the leaves, but finally over the whole lamina, but the upper leaf-surface is scabrous at all times.

The type of this variety was collected by Frederico Carlos Hoehne at Ponta Grossa, Paraná, Brazil, on November 1, 1928, and is deposited in the herbarium of the Instituto Botanico at São Paulo, Brazil. The plant has been found in rocky places, flowering in October and November.

In all, 3 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: BRAZIL: Paraná: F. C. Hoehne s.n. [Ponta Grossa, Nov. 1, 1928] (N--isotype, N—photo of type, Sp--23268—type, Z--photo of type). ARGENTINA: Misiones: Grtner 935 [Herb. Osten 23174] (Ug).

LIPPIA BALANSAE Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 305--306. 1904.

Synonymy: Lippia calliclada Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 306--307. 1904. Lantana jorgenseni Moldenke, Lilloa 5: 412--413. 1940. Lippia jorgenseni Moldenke, Suppl. List Invalid Names 5, in syn. 1941.

Bibliography: Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 305--307. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (10): 490. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Lilloa 5: 412--413. 1940; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Alph. List Invalid Names 31. 1942; Moldenke, Lilloa 8: 423. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 40, 41, 94, & 95. 1942; Moldenke, Alph. List Cit. 1: 26 & 27. 1946; Moldenke, Lilloa 14: 41. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 49 & 66. 1948; Moldenke, Alph. List Cit. 2: 440 & 600 (1948), 3: 692 (1949), and 4: 1237. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99, 188, & 189. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 132. 1953; Moldenke, Résumé 116, 305, 313, & 461. 1959; Troncoso, Darwiniana 12: 258, 259, & 269, pl. 2. 1961; Moldenke, Résumé Suppl. 5: 5 & 7 (1962) and 8: 2. 1964.

Illustrations: Troncoso, Darwiniana 12: 269, pl. 2. 1961.

Small tree, slender medium-sized shrub, or bush, 1--4 m. tall; stems very aromatic; branches ascending, tetragonal or hexagonal, loosely pubescent throughout with somewhat crisped hairs; branchlets slender, sordid-green, tetragonal or hexagonal, ascending, virgate, shortly pilosulous with somewhat crisped hairs to puberulent or short-pubescent, especially when young, the pubescence longer and denser at the nodes; middle internodes 2--4 cm. long; leaves medium-sized, fragrant or very aromatic, with the odor of witch-hazel (Hamamelis) when crushed, decussate-opposite or ternate, subsessile or short-petiolate; petioles slender, 2--5.8 mm. long, rather densely short-pubescent with crisped hairs; leaf-

blades rather thick and heavy, firm-textured or subcoriaceous, sordid-green above, paler beneath, broadly ovate to elliptic or lanceolate, sometimes narrow-elliptic, 1--4 cm. long, 0.4--2.5 cm. wide, evenly convex along the margins but more so below the middle, acute or subacute to rather obtuse at the apex, densely serrate or crenulate to serrulate-cremulate from almost the base to the apex with regular small rounded teeth (the teeth 0.5--1 mm. long and 0.2--1 mm. apart), acuminate or broadly rounded-coarctate as well as 3-plinerved and entire at the base, often cuneately narrowed into the petiole, short-pilose and very scabrous or appressed-pubescent above and more or less bullate (when mature), scattered-pilose or rather densely and loosely short-pubescent to densely velutinous-pubescent and densely resinous-punctate beneath; midrib, secondaries, and veinlet reticulation impressed above, prominent beneath; inflorescence axillary, capitate, more or less racemosely grouped toward the apex of the branches; peduncles very slender, 0.8--3 cm. long, subequaling or slightly surpassing the subtending leaves, tetragonal, short-pubescent with antrorse or somewhat crisped hairs or sparsely puberulent, varying to glabrescent, sometimes sparsely glandulose, 6--8 per node; heads small, subspheric, about the size of a large pea (Pisum sativum), 5--6 mm. long, 6--8 mm. wide, many-flowered, conspicuously white-villous among the bractlets; bractlets small, lanceolate or ovate-elongate to ovate-acuminate, 2--4 mm. long, acute or subacute at the apex, lightly or densely short-pubescent with brownish hairs on the outer surface, glabrescent on the inner surface, the lower ones scarcely surpassing the flowers, the rest somewhat shorter than the flowers; flowers fragrant; calyx minute, campanulate, about 1 mm. long, 2-lipped, the lips entire or obscurely lobulate, exalate, antrorsely pubescent on the outer surface; corolla hypocrateriform, pale-yellow to rose, pale-rose, or pinkish-rose, small, surpassing the calyx by only 2--2.5 mm., its tube exserted, puberulent or pubescent above, the limb unequally 4-lobed, the posterior lobe longer, 0.7--0.8 mm. long, the rest scarcely 0.5 mm. long; stamens and pistil included, normal for the genus; nutlets small, ovate, 1--2 mm. long, hard, glabrous.

The type of this distinctive species was collected by Benedict Balansa (no. 1033) -- in whose honor it was named -- at Pâturages d'Itangu, near Villa Rica, Paraguay, on February 17, 1876, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where Macbride photographed it as his type photograph number 24645. The type of L. calliclada is Balansa 1033a from Caaguazu, Paraguay, collected on November 6, 1874, and also deposited in the Delessert Herbarium. The type of Lantana jorgenseni was collected by Pedro Jörgensen Hansen (no. 3778) -- in whose honor it was named -- at Villa Rica, Paraguay, in October, 1930, and is deposited in the Britton Herbarium at the New York Botanical Garden.

Jörgensen describes the plant as very common; Archer notes that "this plant could easily serve as basis of extraction of an essen-

tial oil". It has been collected in anthesis in October and from December to February. The flowers are described as "rose" on Archer 4826 and Hassler 6735, as "pinkish-rose" on Balansa 1033, and as "pale-yellow, pale-rose, or pink" on Jörgensen 3778.

Briquet (1904) describes the venation of the leaves of his L. balansae as "nervo medio pennato, omnibus reticulum connexis, rete valido paginam superiorem rugante et fodiente, subtus valde prominulo" and the fruit as "mericarpio parva dura, cum calicis extus adpresse prorsus pubescentis laciniis secedentis" and says of it "Cette espèce se place tout près du L. rubiginosa Schauer...dont elle se distingue facilement par ses feuilles (ternées) plus grandes, largement ovées, très scabrés (et non strigoso-pubescentes) en dessus, à nervation très réticulée-rugueuse mais assez différente par la disposition des nervures latérales, par ses pédoncules égalant ou dépassant un peu les feuilles (et non pas notablement plus courts), ses bractées densement pubescentes extérieurement (et non pas à peine pubérulentes-glanduleuses et ciliées sur les marges)."

Of his L. calliclada he says: "Le L. calliclada est fort voisin du L. Balansae. Nous aurions été tenté d'y voir une variété remarquable, si l'absence de formes intermédiaires ne s'opposait, au moins dans l'état actuel de nos connaissances, à cette réduction. Le L. calliclada s'écarte du L. Balansae par ses feuilles étroitement elliptiques, cunéiformes et plus nettement pétiolées à la base, non scabres à la face supérieure. Les feuilles supérieures plus réduites, dépassées par les pédoncules rassemblés en une sorte de grappe lui donnent aussi un aspect un peu différent. L'apparence général des L. Balansae et calliclada repellent plutôt celle des Lantana que des Lippia, mais les caractères du fruit ne laissent aucun doute sur leurs vraies affinités." He describes its leaf-venation as "nervo medio pennato, omnibus r reticulescentibus sed laminam parum rugantibus" and the fruit as "cum calice fisso extus pilis longis prorsus versis vel patulis obtecta secedentia."

Troncoso (1961) says "Especie muy característica por sus hojas generalmente ternadas y capítulos pequeños, subesféricos, pedunculados en número de 2--3 por axila. He visto un isotipo en el Herb. de Paris pero no me fue posible dibujarlo. Reproduzco el fototipo del Chicago Nat. Mus. No. 2645. L. calliclada Briq., según su autor es una especie muy afín a L. balansae. Considero que se trata de la misma especie. Los caracteres que da Briquet para diferenciarla, forma y tamaño de las hojas y capítulos a veces en racimos terminales, son muy vagos y difíciles de delimitar, más bien se tratan de variaciones dentro de la especie."

The Briq. in Chod. & Hassler, Pl. Hassler. 2 (10): 490 (1904) reference cited above is sometimes cited as "Plantae Hassleranae I (1904) 490" or as "Briq., Plant. Hassler. 2: 490."

Herbarium material of this taxon has been misidentified and distributed in herbaria under the name L. germinata H.B.K. On the other hand, the Jörgensen 2471 and Herb. Osten 11876, distributed

as L. balansae, are actually L. alba (Mill.) N. E. Br.

Troncoso (1961) cites the following specimens, not as yet seen by me, from Paraguay: Balansa 1033 (P--isotype); Hassler 6735 (Cb, P), 8653 (Bm, Cb, P), 12484 ("BAF", Bm, Cb); Jörgensen 3778 (P, Si); T. Rojas 4826 (Si), 4893 (Si), 9211 (Si).

In all, 24 herbarium specimens and 3 mounted photographs, including type or phototype material of most of the names involved, have been examined by me.

Citations: BRAZIL: Minas Gerais: Heringer 3835 (Z). PARAGUAY: Archer 4679 (W--1705498), 4826 (W--1705562); Balansa 1033 [Macbride photos 24645] (It--photo of type, Kr--photo of type, N--photo of type); Hassler 4608 (N), 6735 (Ca--944338, N, N, S, V--260), 8653 (Ca--929819, N, N, V--1209), 12484 (Ca--929699, N, W--1057388); Jörgensen 3778 [Herb. Osten 22236] (Du--197832, It, N, N, S, Ug, W--1483813), s.n. [Villarica; Herb. Mus. Argent. Cienc. Nat. 28/2070] (N).

LIPPIA BAUMII Gürke in Warb., Kunene-Sambesi Exped. 350. 1903.

Synonymy: Lippia asperifolia Hochst. ex Moldenke, Alph. List Invalid Names Suppl. 1: 13, in syn. 1947 [not L. asperifolia Benth., 1947, nor H.B.K., 1863, nor Poepp., 1832, nor Reichenb., 1828, nor A. Rich., 1801, nor L. C. Rich., 1959].

Bibliography: Gürke in Warb., Kunene-Sambesi Exped. 350. 1903; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 51 & 95. 1942; Moldenke, Phytologia 2: 340 & 341. 1947; Moldenke, Alph. List Invalid Names 13. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 50. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 117--119, 121, & 189. 1949; Moldenke, Alph. List Cit. 4: 996 & 1173. 1949; Moldenke, Résumé 144, 146, 147, 152, 310, & 461. 1959.

Shrub, to 0.5 m. tall; stems erect, hirtous-pubescent; branches elongate, divaricate; leaves decussate-opposite, sessile, lanceolate, to 6 cm. long and 2 cm. wide (the upper ones considerably smaller), rather obtuse at the apex, serrate along the margins, strigose-hirsute on both surfaces with rather long appressed hairs, canescent beneath; inflorescence axillary in the upper leaf-axils, extraordinarily long-pedunculate; peduncles very slender, to 11 cm. long, solitary, often twice as long as the subtending leaves, hirtellous-pubescent; bractlets closely imbricate, sessile, strigose-hirsute with appressed hairs, canescent, the lowermost ovate-lanceolate, to 12 mm. long and 5 mm. wide, acuminate at the apex, decreasing in size and especially in width toward the apex of the heads, the uppermost lanceolate or lanceolate-linear, 3--5 mm. long and 1 mm. wide, acute at the apex; calyx 1.5 mm. long, 2-parted almost to the base, not alate, the lobes broadly ovate, acute at the apex, strigose-hirsute on the outer surface; corolla yellow, its tube 5 mm. long, 3--4 times longer than the calyx.

The type of this species was collected by H. Baum (no. 515) -- in whose honor it was named -- in sandy soil at 1200 meters alti-

tude between Ungombekike on the Rubango and Kuito, in Southwest Africa, on December 9, 1899, and was deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed. The name, L. asperifolia Hochst., appears to be based on Baum 250, also from Southwest Africa, deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The L. asperifolia of H.B.K., of Poeppig, and of A. Richard are synonyms of L. alba (Mill.) N. E. Br., that of Bentham and of Reichenbach are Phyla scaberrima (A. L. Juss.) Moldenke, and that of L. C. Richard is Lippia javanica (Burm. f.) Spreng.

Gürke (1903) says of this plant: "Die Art gehört zur Untergattung Zapania (Scop.) Benth. § Euzapania Briq., Gruppe der Axilliflorae (Schauer) Briq. Sie ist verwandt mit der weit verbreiteten Lippia asperifolia Rich., obwohl sie habituell gar keine Aehnlichkeit mit ihr hat. Die neue Art hat einen auffallend sparrigen Wuchs mit weit abstehenden Zweigen, grauweisse Behaarung und sehr lang gestielte Köpfchen; auch beträgt die Länge des Kelches nur 1/3 derjenigen der Blumenkronenröhre."

The species has been collected at altitudes of 1200 to 2185 meters, flowering in October and December, fruiting in October. Herbarium material has been misidentified and distributed in herbaria under the names L. asperifolia A. Rich. and L. wilmsii H. H. W. Pearson.

In all, 4 herbarium specimens and 5 mounted photographs, including type material of both names involved, have been examined by me.

Citations: TANGANYIKA: Haarer 2263 (Br). KENYA: Thorold 2733 (Br). SOUTHWEST AFRICA: Baum 250 (Br), 515 (Br--isotype, F--photo of isotype, N--photo of isotype, N--photo of isotype, Si--photo of isotype, Z--photo of isotype).

LIPPIA BELLATULA Moldenke, Résumé Suppl. 10: 3 & 5 (1964), Phytologia 10: 170. 1964.

Synonymy: Lippia bicolor Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 587. 1847 [not L. bicolor Kunth & Bouché, 1845, nor Kunth, 1942]. Lippia bicolor Mart. ex Moldenke, Résumé Suppl. 10: 5, in syn. 1964.

Bibliography: Kunth & Bouché, Ind. Sem. Hort. Berol. 1845: 10. 1845; Schau. in A. DC., Prodr. 11: 587. 1847; Schau. in Mart., Fl. Bras. 9: 240. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 189. 1949; Moldenke, Alph. List Cit. 3: 691 & 711. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Résumé Suppl. 10: 3 & 5. 1964; Moldenke, Phytologia 10: 170. 1964.

Shrub, to 1 m. tall; stems squarrose, branched; branchlets subtetragonal, hirtous; leaves small, varying from decussate-opposite or more or less approximate to ternate, sessile, variable in size and shape, ovate or subrotund to subreniform, 4--8 mm. long, 3--6

mm. wide, rigid, patulous, acute at the apex, crenate along the margins, strigose-hispidulous above and along the revolute margins, hirtous-tomentose and somewhat canescent beneath; inflorescence axillary; heads subsessile, solitary, 5- or 6-flowered, exserted, about 4 aggregate at the apex of the branchlets, conglobate, subinvolucrate; bractlets herbaceous, rigid, ovate, subacuminate at the apex, loosely imbricate, hispidulous, about half as long as the corolla-tube; calyx hardly more than 1 mm. long, bifid, hirsute, the lobes somewhat bidentate; corolla rose, yellow in the throat, pubescent on the outer surface, its tube straight, cylindric, about 4 mm. long, subventricose at the middle, the limb somewhat larger, the lobes rotund; fruit medium in size, subglobose, dark, obscured by the mature calyx; cocci subequal, separating with difficulty.

The type of this rare species was collected by Carl Friedrich Philipp von Martius (no. 1983) in fields at Villa do Rio de Contas, Bahia, Brazil, and is deposited in the herbarium of the Botanisches Museum at Munich, where it was photographed by Macbride as his type photograph number 20322. The L. bicolor of Kunth & Bouché and of Kunth are synonyms of L. callicarpaefolia H.B.K.

Schauer places our plant in his Section Zapania, Subsection Axilliflorae. It has been collected in anthesis in October and is known thus far only from the type collection, of which 3 mounted photographs have been examined by me.

Citations: BRAZIL: Bahia: Martius 1983 [Macbride photos 20322] (It--photo of type, Kr--photo of type, N--photo of type).

LIPPIA BOCAINIENSIS Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541, hyponym, 1911.

Bibliography: Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541. 1911; Prain, Ind. Kew. Suppl. 5: 153. 1921; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 189. 1949; Moldenke, Alph. List Cit. 4: 1300. 1949; Moldenke, Résumé 93 & 461. 1959.

Nothing is known to me of this supposed species except what little is said about it in the original publication, where it is recorded as "L. bocainiensis Glaz., n. sp.?" and the type is stated to be Glaziou 11340 from "Campos da Bocaina, au Sobrado, S. Paulo", Brazil. It is described merely as "Frutescent, fl. lilas. Août-septembre. C", with specimens deposited in the herbaria at Paris, Berlin, Kew, Copenhagen, and elsewhere, the Paris one probably to be regarded as the actual type; the Berlin one is now destroyed.

LIPPIA BOLIVIANA Rusby, Mem. Torrey Bot. Club 4: 243—244. 1895.

Bibliography: H. H. Rusby, Mem. Torrey Bot. Club 4: 243—244. 1895; Durand & Jacks., Ind. Kew. Suppl. 1: 250. 1903; Briq., Ann. Conserv. & Jard. Bot. Genev. 7-8: 305. 1904; H. H. Rusby, Bull. N. Y. Bot. Gard. 4: 432. 1907; Hayek in Engl., Bot. Jahrb. 42: 166. 1908; Moldenke, Lilloa 5: 422. 1940; F. L. Herrera, Sinop. Fl. Cuzco 1: 351. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed.

1], 40 & 95. 1942; Moldenke, Lilloa 10: 378 (1944) and 12: 148. 1946; Moldenke, Alph. List Cit. 1: 28, 92, & 201. 1946; Moldenke, Phytologia 2: 386. 1947; Moldenke, Lilloa 14: 41. 1948; Moldenke, Alph. List Cit. 2: 370 (1948), 3: 735 (1949), and 4: 1073, 1075, 1079, & 1293. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97, 104, & 189. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Moldenke, Résumé 114, 125, & 461. 1959; A. Maria, Pl. Vall. Coch. 38. 1962; Moldenke, Résumé Suppl. 3: 13. 1962.

Bush or shrub, 0.3—1.8 m. tall, loose and spreading in growth; stems upright, stiff; branches clothed with slender exfoliating strips of bark, brown, terete; branchlets very numerous and slender, erect, 18—25 cm. long, purplish, obscutely tetragonal; internodes 1 to nearly 2 cm. long, very minutely scabrate; leaves decussate-opposite, thick and rigid, aromatic, narrowly oblanceolate, 1.5—2.5 cm. long, 3—7 mm. wide, rounded and retuse at the apex, obscurely serrate toward the apex with blunt thick and rigid teeth, revolute-margined, cuneate at the base and subpetiolate, rugose and papillose above, purple-reticulate beneath; peduncles axillary, solitary, very slender, 4—10 mm. long, papillose; heads small, flattened, about 4 mm. long, 5—13 mm. wide; bractlets closely appressed, oval-obovate, strongly concave, acute at the apex, ciliate; calyx ovoid, nearly 2 mm. long, bifid, densely hispid, the teeth minutely notched; corolla hypocrateriform or infundibular, white to whitish to yellowish-white or pink-white, about 4 mm. long, pubescent, the limb 4-lobed, the upper lobe deeply cleft, the lower obovate, longer than broad; ovary oval, about as long as the style, both together about 2 mm. long, the stigma lateral, not so large as in Lantana achyranthifolia Desf.; mature fruit not seen.

The type of this species was collected by Miguel Bang (no. 979) in the vicinity of Cochabamba, Cochabamba, Bolivia, in 1891, and is deposited in the Columbia University herbarium at the New York Botanical Garden. The original publication is cited at the Instituto Miguel Lillo as "Rusby, Bolivia Memoirs IV (1895) 243" and Dr. Rusby's 1907 publication as "Rusby, Bolivia (1907) 432." The specific name is often uppercased.

The plant has been found in rocky soil, stony soil among cacti, dry bush country, and exposed declivities in the mountains, on hills and hillsides, bare stony open hillsides, and rocky slopes, and among bushes on rocky slopes, at altitudes of 2385 to 3000 meters, flowering from January to March and in June and July. Common names recorded for it are "cedron de monte" and "cedronsillo". Maria (1962) says of it: "De constitución leñosa, alta de 1 a 1,8 mts. de hojas lanceoladas dimimutas, atrae la atención y se presenta agradable a la vista por su penacho de flores blancas diminutas. Es bastante común en las laderas del Tunari y Alalay" and cites his no. 175/3a.

Herbarium material has been misidentified and distributed under the names L. suffruticosa (Griseb.) Hieron. and Aloisia sp. On the other hand, the Ruíz Leal & Roig 18894, distributed as L. bo-

liviana, is actually the very closely related L. integrifolia (Griseb.) Hieron. of Argentina.

The flowers are described as "pink-white" on R. E. Fries 1222, as "yellowish-white to white" on Eyerdam 24885, and as "white" on Balls 6296, Cárdenas 746, 2378, & 2476, Kuntze s.n., and T. Meyer 4547.

In all, 28 herbarium specimens, including the type, have been examined by me.

Citations: PERU: Cuzco: F. L. Herrera 1534 (W--1342313). BOLIVIA: Cochabamba: Asplund 4166 (S, Us); Balls 6296 (W--1777834); M. Bang 979 (C--type, Pa--isotype); M. Cárdenas 746 (W--1743896), 2378 (W--1877083), 2476 (W--1877089); Eyerdam 24885 (Ca--658374, Ew); Kuntze s.n. [Rio Tapacari, 19 Maerz 1892] (N); A. Maria 175 (Z); Troll 1391 (B). Potosí: Fiebrig 3111 [Herb. Osten 15223] (S, Sp, Sp--33504, Ug, W--1178002). Tarija: R. E. Fries 1222 (S, S). Province undetermined: M. Bang 2531 (C, Pa, W--1322890); Kuntze s.n. [Parotani, 20 Maerz 1892] (N). ARGENTINA: Salta: T. Meyer 4547 (Ca--906130, N). San Juan: H. H. Bartlett 20558 (Ca--772500).

LIPPIA BOTHRIOURA Briq., Bull. Herb. Boiss., sér. 2, 4: 1162. 1904.

Bibliography: Briq., Bull. Herb. Boiss., sér. 2, 4: 1162. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 498. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 95. 1942; Moldenke, Lilloa 8: 423 (1942) and 10: 378. 1944; Moldenke, Alph. List Cit. 1: 264. 1946; Moldenke, Phytologia 2: 337. 1947; Moldenke, Lilloa 14: 41. 1948; Moldenke, Alph. List Cit. 2: 458 (1948) and 3: 692 & 911. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99, 100, & 189. 1949; Moldenke, Résumé 116, 119, & 461. 1959; Troncoso, Darwiniana 12: 259 & 287. 1961.

Tall herb or subshrub, 0.5--2 m. tall; stems erect, robust, obtusely tetragonal, green, branched; branches erect or ascending, antrorsely strigose, rather close below, densely canescent above; principal internodes regularly 4--12 cm. long; leaves decussate-opposite, sessile or subsessile, green, rather rigid, elliptic-lanceolate, to 7 cm. long and 1.5 cm. wide, acute or short-acuminate at the apex, somewhat convex along the margins and often somewhat revolute, entire or rather coarsely serrate toward the middle with teeth to 1.5 mm. high, entire and cuneate-attenuate at the base, antrorsely strigose or substrigose-roughened; midrib and secondaries plainly visible, somewhat reticulate, prominent beneath and often somewhat impressed above; inflorescence terminal, thyrsoid-paniculate; peduncles obsolete or to 2 cm. long, axillary in the axils of reduced leaves, canescent, broader after anthesis and minutely villosulous, beautifully foveolate with rhombic areoles; heads small, thick, at first ovoid-subglobose, later more elongate, to 10 mm. long and 2 mm. wide, thickening after anthesis; bracts or bract-like leaves lanceolate, more or less can-

escent, shorter than the peduncles; bractlets canescent on the outer surface, the lower ones scarcely equaling the flowers, ovate, acuminate at the apex, the inner ones much narrower; calyx very small, campanulate, about 0.5 mm. long during anthesis, obscurely 2-lipped, repandly 4-denticulate, pubescent toward the apex on the outer surface; corolla hypocrateriform, yellow, pubescent above, exserted 2--2.5 mm. from the calyx mouth, its tube cylindric at the base, somewhat ampliate toward the apex, the lobes small, ovate-rotund, the anterior one slightly larger, about 0.5 mm. long; stamens and pistil normal for the genus, included; cocci minute, 0.6 mm. long and 0.5 mm. wide, dehiscent with the canescent mature calyx segments, smooth, excavated on the inner surface.

The type of this species was collected by Emil Hassler (no. 7471) in a swamp in the region of the upper Río Apa, in northern Paraguay, in November, between 1885 and 1902, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where it was photographed by Macbride as his type photograph no. 24646.

Briquet (1904) describes the leaf venation as follows: "nervo medio et nervis lateralibus acroscopis [=macroscopis?] parum reticulescentibus subtus prominulis, paginem superiorem saepe aliq. fodientibus" and also says "Cette remarquable espèce appartient à la section Euzapania groupe Paniculatae; son inflorescence à nombreux capitules disposées en thyrse la rapproche des L. vernonioides Cham., L. oxycnemis Schauer et L. herbacea Mart. Les deux premiers s'écartent immédiatement par leurs capitules strobilacés et le dernier par les capitules tétragones-ovoïdes, outre de nombreux autres caracteres. Dans le L. bothrioura, les capitules s'allongent un certain temps par le sommet, mais leur forme générale ne change pas, car les fleurs et fruits tombent à la partie inférieure, au fur et à mesure qu'il se développe de nouveaux boutons au sommet. Les organes tombés laissent à nu un axe régulièrement creusé de fossettes lozangiques (d'où le nom spécifique bothrioura), plus volumineux que le pédoncule, d'un aspect fort élégant."

The Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 498 (1904) reference listed above is cited at the Instituto Miguel Lillo as "Plantae Hasslerianae XI (1904) 498."

The species has been found growing in swamps and on the banks of rivers, flowering from November to January. The Schröder collection cited below probably represents this taxon, but is possesses no leaves and exhibits 1--3 peduncles per leaf-axil and sometimes a branchlet there, too.

Troncoso (1961) reduces the species to synonymy under L. angustifolia Cham., but it seems sufficiently distinct to me. In all, 5 herbarium specimens, including type material, and 3 mounted photographs have been examined by me.

Citations: PARAGUAY: Hassler 7471 [Macbride photos 24646] (Ca--944340--isotype, It--photo of type, Kr--photo of type, N--isotype,

N--photo of type, S--isotype). URUGUAY: Berro 4757 (N); Schröder s.n. [San Gregorio, Jan. 1926; Herb. Osten 19436] (Ug).

LIPPIA BRACTEATA Carr., Rev. Hortic. 53: 380. 1881 [not L. bracteata Clausen, 1947].

Synonymy: Lippia bracteata Hort. ex Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894.

Bibliography: Carr., Rev. Hortic. 53: 380 & 478. 1881; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 73 & 95 (1942) and [ed. 2], 162 & 189. 1949; Moldenke, Résumé 220 & 461. 1959; Moldenke, Résumé Suppl. 10: 4 & 5. 1964.

Nothing is known to me of this taxon except what is stated in the original description: "Plante très-vigoureuse, fortement villeuse, laineuse sur toutes ses parties herbacées. Rameaux quadrangulaires. Feuilles opposées-décussées, grandes, longuement ovales-acuminées, épaisses, scabres, fortement réticulées en dessus, à face inférieure tomenteuse par des poils argentés laineux. Inflorescence capitiforme rappelant celle des Lantana, subsphérique, au sommet d'un pédoncule d'environs 5 centimètres de longueur; bractées nombreuses, papyracées, accrescentes, sessiles et élargies à la base, d'un rose vineur ou violacé. Fleurs axillaires petites, longuement tubuleuses, à tube blanc terminé par quatre divisions étalées, très-petites, ovales arrondies, d'un rouge brique ou fauve. Cultivée avec soin et soumise à des pincements appropriés, cette espèce pourrait devenir une belle plante d'ornament pour les serres d'abord, puis pour les jardines, où, mise en plein terre pendent l'été, elle fleurirait continuellement. Serre chaude, serre tempérée ou orangerie, suivent qu'on tient à avoir des fleurs pendant l'hiver."

The article in which this description appears is not signed, but the editor-in-chief of the journal in which it appears was at that time Elie Abel Carrière, so it seems likely that the name should be accredited to him. The L. bracteata of Clausen is a synonym of L. lupulina Cham.

LIPPIA BRACTEOSA (Mart. & Gal.) Moldenke, Phytologia 2: 226. 1947.

Synonymy: Lantana bracteosa Mart. & Gal., Bull. Acad. Roy. Brux., sér. 1, 11 (2): 326. 1844. Lippia nutans Robinson & Greenm., Am. Journ. Sci. 150 [ser. 3, 50]: 162. 1895. Lippia bracteosa Mart. & Gal. ex P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1246, in syn., sphalm. 1924. Lippia nutans Bob Greenm. ex Moldenke, Résumé Suppl. 10: 6, in syn. 1964.

Bibliography: Mart. & Gal., Bull. Acad. Roy. Brux., sér. 1, 11 (2): 326. 1844; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 28. 1894; Robinson & Greenm., Am. Journ. Sci. 150 [ser. 3, 50]: 162. 1895; Durant & Jacks., Ind. Kew. Suppl. 1: 250. 1903; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1244 & 1246. 1924; Moldenke, Prelim. Alph. List Invalid Names 30. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 96. 1942; Moldenke, Phytologia 2: 226 &

330. 1947; Moldenke, Alph. List Invalid Names 11, 13, & 15. 1947; Moldenke, Alph. List Cit. 2: 393 & 473 (1948), 3: 829, 830, 834, 835, & 872 (1949), and 4: 1211 & 1294. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31 & 189. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 36, 303, 311, 316, & 461. 1959; Moldenke, Résumé Suppl. 10: 6. 1964.

Shrub, 0.8--1.8 m. tall, unarmed; stems grayish, glabrate; branchlets pale-brown, angulate, sparingly puberulent or tomentose-villous; leaves decussate-opposite, subsessile or short-petiolate; petioles to 4 mm. long, canaliculate and hispid-pubescent above; leaf-blades thickish, ovate-oblong or ovate, about 2.5 cm. long and 1.7 cm. wide, acutish at the apex, cuneate at the base, serrate along the margins, rugose or strongly rugose-warty, hispidulous and slightly shiny above, paler and rather densely pubescent or canescent-villous beneath; peduncles slender, about 1.8 cm. long, subequaling the subtending leaves, opposite in the upper leaf-axils, commonly recurved or nodding, pubescent; heads globose or hemispheric, about 2.5 cm. wide; bractlets foliaceous, large, thin, pale, subchartaceous or scarious, 8--12 mm. long, 4--6 mm. wide, obtuse at the apex, reticulate, glandular-pubescent on both surfaces, ciliate, the lowest ovate, the upper more elliptic; flowers short-pedicellate, about 7 mm. long; calyx densely pubescent; corolla yellowish, shorter than the bractlets.

The type of this distinctive species was collected by Henri Guillaume Galeotti (no. 761) on calcareous mountains at Tehuacan de las Granadas, at 6500 feet altitude, in the Cordillera of Oaxaca, Mexico, in August, 1840, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The type of L. nutans was gathered by Cyrus Guernsey Pringle (no. 5650) in Las Hoyas Canyon, at 4500 feet altitude, Oaxaca, Mexico, in November, 1894, and is probably deposited in the Gray Herbarium of Harvard University.

Martens & Galeotti (1844) make this comment: "Species nostra bracteis magnis imbricatis quae cum bracteis coni Humuli lupuli L. similitudinem quamdam gerunt a caeteris speciebus facile distinguitur."

The species has been collected in dry bushwoods and on the dry slopes on canyons, at altitudes of 1000 to 2665 meters, flowering and fruiting in February, July to September, and November. Purpus 10146 and 10380 could have been collected either in Chiapas or in Jalisco -- the labels carry both state names. In my 1940 and 1942 publications I regarded Lantana bracteosa as synonymous with Lippia callicarpaefolia, but this was in error. Herbarium material has been misidentified and distributed in herbaria as L. callicarpaefolia H.B.K. and L. cardiostegia Benth.

In all, 27 herbarium specimens and 4 mounted photographs, including type material of all the names involved, have been examined by me.

Citations: MEXICO: Chiapas: M. C. Carlson 1648 (Mi); Purpus 10146 (Ca--278031, S). Jalisco: Purpus 10380 (N, Po--146421).

Oaxaca: C. Conzatti 1564 (Me), 4248 (Me); Galeotti 761 (Br--type, F--photo of type, N--photo of type, Si--photo of type, Z--photo of type); Pringle 5650 (Me, Me, Vt), 6175 (Br, C, Ca--104913, Cm, Io--38727, Me, Me, Me, Mi, Mm--15408, S, Vt); Rose & Rose 11368 (N). Puebla: Purpus 2570 (Ca--139667, N), 3926 (Ca--139666).

LIPPIA BRADEI Moldenke, Phytologia 3: 61--62. 1949.

Bibliography: Moldenke, Phytologia 3: 61--62 & 74. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 93 & 461. 1959.

Shrub; branchlets slender, obtusely tetragonal, densely short-pubescent with erect glandular-capitate hairs, the brownish bark splitting irregularly into longitudinal fissures; nodes rather obscurely annulate; principal internodes 1--2.5 cm. long; leaves decussate-opposite; petioles very slender, about 3 mm. long, densely short-pubescent with erect glandular-capitate hairs; leaf-blades coriaceous, suborbicular, 7--11 mm. long, 6--12 mm. wide, regularly undulate-repand and slightly subrevolute along the margins, rather densely short-pubescent on both surfaces with capitate hairs but the glandular tips soon wearing off; midrib very slender, impressed above, prominent beneath; secondaries very slender, 3 or 4 per side, ascending, impressed above, prominent beneath, terminating in the sinuses of the marginal undulations; veinlet reticulation limited to a few more or less parallel tertiaries which connect the secondaries at right angles, subimpressed above, prominulous beneath; inflorescence axillary, capitate, 2 per node, surpassing the subtending leaves, widely divergent in fruit; peduncles slender, 1--1.5 cm. long in anthesis, elongate to 4 cm. in fruit, densely glandular-pubescent like the branchlets; heads hemispheric, 1--1.5 cm. wide, densely many-flowered; bractlets large, elliptic, about 5 mm. long and 1.5 mm. wide, densely glandular-pubescent, subacute at the apex; corolla lilac, its tube about 4 mm. long, densely glandular-puberulent on the outer surface, its limb about 3 mm. wide.

The type of this distinct species was collected by Friedrich Markgraf, Henrique Lahmeyer de Mello Barreto, and Alexandre Curt Brade (no. 3369) on rock of Algonquian age at Montes Claros, Serra do Calixto, Minas Gerais, Brazil, on November 11, 1938, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is named in honor of Dr. Brade, distinguished botanist, respected colleague and friend, for many years with the Jardim Botanico at Rio de Janeiro. It is known to me thus far only from the type collection, and only the type specimen and 4 mounted phototypes have been examined by me.

Citations: BRAZIL: Minas Gerais: Markgraf, Mello Barreto, & Brade 3369 [Herb. Jard. Bot. Rio Jan. 40069] (F--photo of type, N--type, N--photo of type, Sg--photo of type, Z--photo of type).

LIPPIA BURTONII J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 281. 1900.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 281. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 49 & 95. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 52. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 115 & 189. 1949; Moldenke, Phytologia 3: 292 & 293. 1950; Moldenke, Résumé 142, 148, 426, & 461. 1959; Moldenke, Résumé Suppl. 1: 9. 1959.

Undershrub; branchlets woody, slender, slightly bristly; leaves sessile, ternate, oblong, crenate along the margins, rugose like those of L. javanica, scabrous above, densely pubescent and with raised veins beneath; heads many from a single node, very short-pedunculate, globose, about 8 mm. in diameter; bractlets ovate, 3--4 mm. long, acuminate at the apex, very hairy; corollas not longer than the bractlets.

The type of this species was collected by Sir Richard Francis Burton -- in whose honor it was named -- at Mondanda in the Republic of Congo Leopoldville in September, 1863, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The species has been found growing on waste farmlands, flowering in March and September, fruiting in March. Deschamps says of it: "plante annuelle, hauteur 40 cm., feuillage vert clair, fleurs mauves en inflorescence, Usage: sert dans les maladies des yeux." Quarré 1370 is placed here tentatively.

Herbarium material has been misidentified and distributed in herbaria under the names L. asperifolia Rich., L. ukambensis Vatke, and Lantana salvifolia Jacq. On the other hand, the Peter 2229, distributed as L. burtonii, and 42873 as "Lippia n. sp. aff. L. burtonii", are both L. javanica (Burm. f.) Spreng.

Baker (1900) separates the 8 tropical African species of this genus known to him more or less as follows:

1. Bractlets orbicular, obtuse.
   2. Peduncles very short.....L. oatesii Rolfe.
   2a. Peduncles long.....L. radula J. G. Baker.

1a. Bractlets cuspidate.
   3. Leaves small.
      4. Leaves orbicular or obovate.....L. somalensis Vatke.
      4a. Leaves oblong, rugose....L. javanica (Burm. f.) Spreng.

1b. Bractlets acuminate.
   5. Leaves opposite.....L. ukambensis Vatke.
   5a.....L. burtonii J. G. Baker.

1c. Bractlets acute.....L. plicata J. G. Baker.

In all, 6 herbarium specimens, including the type, and 9 mounted photographs have been examined by me.

Citations: NIGERIA: Dalziel 696 (F--photo, K, N, N--photo, Sg--photo, Si--photo, Z--photo). CONGO LEOPOLDVILLE: R. F. Burton s. n. [Sept. 1863] (F--photo of type, K--type, N--photo of type, Sg--photo of type, Z--photo of type); L. Deschamps 45 (Br); Quarré 1370 (Br). TANGANYIKA: Peter 51781 [0.I.65] (B).

LIPPIA CAFFRA Sond., Linnaea 23: 88. 1850.

Bibliography: Sond., Linnaea 23: 88. 1850; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 95 (1942) and [ed. 2], 122 & 189. 1949; Moldenke, Résumé 153 & 461. 1959.

Suffruticose herb or shrub, 6 inches tall, with the general habit and foliage of Lantana rugosa Thunb., but differing in pubescence, the hairs subvillous and spreading; stems terete or obsoletely tetragonal; branches and branchlets terete, villous-pubescent; leaves decussate-opposite, petiolate; petioles 6 mm. long; leaf-blades oblong-ovate, acute at the apex, obtuse at the base, coarsely dentate along the margins, softly hirsute-pubescent, subincanous beneath, the larger ones 2.5 cm. long and 1.4 cm. wide; peduncles axillary, solitary, subequaling the leaves, very villous; flowering heads subglobose; bractlets herbaceous, ovate, acuminate at the apex, pubescent, the outer ones involucrate and 6 mm. long, the inner ones 2 mm. long and somewhat shorter than the corollas; calyx about 1 mm. long, very hirsute, much shorter than the corolla-tube; corolla 4 mm. long, pubescent on the outer surface, the limb short, somewhat 2-lipped, the upper lip subemarginate, the lower lip 3-fid.

The type of this little-known species was collected by Carl Ludwig Philipp Zeyher along the Aapjes River, Transvaal, in the Republic of South Africa. It is known to me only from the original description.

LIPPIA CALLENSI Moldenke, Phytologia 3: 378, nom. nud. (1950); Am. Journ. Bot. 38: 326--327. 1951.

Bibliography: Moldenke, Phytologia 3: 378. 1950; Moldenke, Am. Journ. Bot. 38: 326--327. 1951; G. Taylor, Ind. Kew. Suppl. 12: 82. 1959; Moldenke, Résumé 142 & 461. 1959.

Herb; stems apparently simple, rather stout, obtusely tetragonal, deeply 4-sulcate, very conspicuously 4-costate, especially below, very densely brownish-pubescent; nodes annulate; principal internodes elongate, 6--18 cm. long; leaves decussate-opposite, remote, sessile, firmly thick-chartaceous, lanceolate-elliptic, 6--13 cm. long, 1--3 cm. wide, obtuse or subacute at the apex, crenate along the margins from the base to the apex with low, rounded, divergent teeth, attenuate-acute at the base, very shortly pubescent or puberulent above, more densely short-pubescent on the venation beneath and pilosulous on the lamina, decidedly roughened above when mature; midrib slender, flat or subprominulous in a slight channel above, prominent beneath; secondaries very slender, numerous, close, 9--15 per side, arcuate-ascending, flat above, promimulent beneath, not anastomosing; veinlet reticulation abundant, obscure above, prominulous beneath; inflorescence axillary and terminal, long-pedunculate, paniculate-spicate; peduncles stout, upwardly arcuate, 6--12 cm. long, sulcate, very densely pubescent with brownish multicellular hairs, the terminal one usually terminated by a pair of foliaceous bracts similar to the leaves in all respects but only 1.3--2.5 cm. long and 1--1.2

cm. wide; spikes very densely flowered and white-lanate, subcapitate, 8--12 mm. long, 8--13 mm. wide, 1--3 at the apex of the peduncle, sessile or short-stipitate on axillary inflorescences, the stalks 1--2.5 cm. long on the terminal inflorescence and densely pubescent like the stems and peduncles; a pair of bracts often subtending each spike or each group of 3 spikes, the bracts ovate, foliaceous, about 1 cm. long and almost as wide, acuminate at the apex, densely brownish-tomentellous on both surfaces; bractlets lunate-flabelliform, about 3 mm. long and 6 mm. wide, nigrescent on the inner surface, very densely white-villous or -lanate on the outer surface; corolla surpassing the bractlets by about 4 mm.

The type of this very distinct species was collected by Father H. Callens (no. 2275) -- in whose honor it was named -- at Panzi, Republic of the Congo, on February 8, 1950, and is deposited in the Britton Herbarium at the New York Botanical Garden. In all, 3 herbarium specimens, including the type, have been examined by me.

Citations: CONGO LEOPOLDVILLE: Callens 1272 (N), 2275 (N--type), 3966 (N).

LIPPIA CALLENSI var. VILLOSA Moldenke, Phytologia 3: 419. 1951.

Bibliography: A. Chev., Sudania 1: 100. 1911; Moldenke, Biol. Abstr. 25: 3051. 1951; Moldenke, Phytologia 3: 419 & 456 (1951) and 4: 189. 1953; Moldenke, Résumé 140, 142, & 461. 1959.

This variety differs from the typical form of the species in having its leaves often whorled, obovate-elliptic, to 6 cm. wide, its heads smaller and denser, less than 1 cm. wide, and the pubescence on the stems fulvous-villous, very dense and velutinous toward the apex.

The type of this variety was collected by W. Mullenders (no. 2093) in a herbaceous savanna, at an altitude of 870 meters, at Kassendjim, Haut Lomami, Republic of the Congo, on February 27, 1948, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The plant is described by Mullenders as herbaceous, 1 m. tall, with blue flowers, growing in the savanna formations, flowering in January and February. Chevalier (1911) collected it in December and cites his no. 6550 as Icacina senegalensis Juss. of the Icacinaceae.

In all, 5 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: CENTRAL AFRICAN REPUBLIC: Ubangi-chari: A. Chevalier 6550 (Br, N). CONGO LEOPOLDVILLE: Mullenders 2093 (Br--type, N--photo of type, Z--photo of type), 2331 (Br, N).

LIPPIA CALLICARPAEFOLIA H.B.K., Nov. Gen. & Sp. Pl. 2: 268--269. 1818.

Synonymy: Lippia callicarpaefolia Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 54. 1840. Lippia mexicana Cav. ex Steud., Nom. Bot., ed. 2, 2: 54, in syn. 1840 [not L. mexicana Hocking, 1955, nor Moldenke, 1947]. Lippia bicolor Kunth & Bouché, Ind.

Sem. Hort. Berol. 1845: 10. 1845. Lippia calocephala Zucc., Del. Sem. Hort. Monac. 4. 1846. Lippia callicarpaefolia Humb. & Kunth ex Benth., Pl. Hartw, 245 [as "callicarpaefoliae"]. 1846. Lippia callicarpaefolia Kunth ex Schau. in A. DC., Prodr. 11: 591. 1847. Lippia iodantha Robinson & Greenm., Garden & Forest 9: 103 & 105, fig. 11. 1896. Lippia bicolor Kunth ex P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1246, in syn. 1924. Lippia callicarpiaefolia Kunth ex Hegi, Illustr. Fl. Mittel Eur. 5 (3): 2240. 1927. Lippia callicarpifolia H.B.K. ex A. B. Seymour, Host Ind. Fungi N. Am. 588. 1929 [not L. callicarpifolia Schau., 1959]. Lippia arborea Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 30, in syn. 1940. Lippia involucrata Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 31, in syn. 1940. Phryma arborea Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 36, in syn. 1940. Lippia arborea Pavon & Moldenke ex Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 95, nom. nud. 1942. Lippia callicorpifolia Kunth ex Moldenke, Alph. List Invalid Names Suppl. 1: 13, in syn. 1947. Lippia gigantea Harv. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia callicorpaefolia Kunth ex Moldenke, Résumé Suppl. 10: 5, in syn. 1964.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl. 2: 268—269. 1818; Steud., Nom. Bot., ed. 2, 2: 54. 1840; Walp., Repert. Bot. Syst. 4: 54—55. 1845; Kunth & Bouché, Ind. Sem. Hort. Berol. 1845: 10. 1845; Benth., Pl. Hartw. 245. 1846; Zucc., Del. Sem. Hort. Monac. 4. 1846; Schau. in A. DC., Prodr. 11: 591—592. 1847; Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863; Bocq., Adansonia 3: 244. 1863; Podwissotzki, Zeitschr. Allg. Oesterr. Apoth. Ver. 21 (30): 469—471. 1883; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 152. 1895; Robinson & Greenm., Garden & Forest 9: 103 & 105, fig. 11. 1896; Barnhart, Bull. Torrey Bot. Club 29: 597. 1902; Loes. in Fedde, Repert. Nov. Sp. 9: 366. 1911; Loes., Verh. Bot. Ver. Brand. 53: 78. 1912; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1244 & 1246. 1924; Hegi, Illustr. Fl. Mittel Eur. 5 (3): 2240. 1927; A. B. Seymour, Host Ind. Fungi N. Am. 588. 1929; Stapf, Ind. Lond. 4: 125. 1930; A. W. Hill, Ind. Kew. Suppl. 9: 161. 1938; Moldenke, Alph. List Common Names 27. 1939; Moldenke, Prelim. Alph. List Invalid Names 29—31 & 36. 1940; Leon Alvarez, Contrib. Estud. Acc. Estrog. Salvia 1—53, mss. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20, 35, & 95. 1942; Moldenke, Alph. List Invalid Names 28—31 & 36. 1942; Moldenke, Phytologia 2: 107. 1945; Moldenke, Alph. List Cit. 1: 33, 251, & 262. 1946; Moldenke, Phytologia 2: 330 & 347. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 13 & 14. 1947; Moldenke, Alph. List Cit. 2: 351, 352, 357, 389, 393, 414, 526, 540—543, & 573 (1948), 3: 685, 696, 766, 774, 801, 820, 830, 878, 919, 926, 960—962, & 973 (1949), and 4: 999, 1074, 1081, 1235, 1256, & 1294. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35, 73, 162, & 189. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9.

1949; Moldenke, Inform. Mold. Set 49 Spec. 2 (1954) and 51 Spec. 3. 1956; Moldenke, Résumé 36, 42, 84, 220, 310--313, 334, 360, 460, & 461. 1959; Moldenke, Phytologia 8: 131. 1961; Moldenke, Résumé Suppl. 3: 33 (1962), 8: 4 (1964), 10: 2, 3, 5, & 6 (1964), and 11: 7. 1964; Langman, Select. Guide Lit. Flow. Pl. Mex. 421, 440, 588, 596, & 1010. 1964.

Illustrations: Robinson & Greenm., Garden & Forest 9: 105, fig. 11. 1896.

Shrub or low bush to tree, 1--4.5 m. tall; branches tetragonal, short-hirsute or hirtous-tomentose, canescent; twigs slender, tetragonal, densely tomentose; leaves decussate-opposite, petiolate; petioles slender, short, 1--2 cm. long, canaliculate, densely floccose- or incanous-tomentose; leaf-blades dark-green or dark grass-green above, silvery-gray or gray-green and reticulate beneath, thickish-chartaceous, elliptic or ovate to ovate-oblong, 5--12.5 cm. long, 3--7.5 cm. wide, acute at the apex, acute or obtuse to abruptly decurrent and narrowed into the short petiole at the base, regularly serrate or crenate from the base to the apex with small blunt or subacute somewhat spreading teeth, rather densely hirsute-pubescent or softly pilose with bulbous-based hairs above, becoming rough and reticulate-bullate or rugose-scabrous in age, very densely floccose-lanate or softly incanous and pilose-tomentose to tomentose or canescent-tomentose beneath, reticulate-venose, the venation impressed above; inflorescence axillary, clustered, usually 2--4 in each axil, or in terminal, sessile, subsimple, bracteate panicles 5--7.5 cm. long, the branches subverticillate, tetragonal, hirtous-tomentose and incanous; peduncles very slender, numerous, 5--6 cm. long, densely hirsute-tomentose, ascending; heads semi-globose, 1--2 cm. long, 1.5--2.5 cm. wide, about the size of a Prunus spinosa fruit, pedunculate, purple; bracts at first pale-green, then orange, finally rose-purple, ovate or broadly ovate, acute at the apex, reticulate-venose, sericeous-pubescent on the outside, twice as long as the flowers, imbricate; flowers sessile, 3 mm. long; calyx campanulate, compressed, sub-bidentate, very densely white-pilose; corolla infundibular, pale-yellow or yellow to orange, or whitish and turning brown [also described as "purple", but this probably refers to the bracts], glabrous, the tube longer than the calyx, the limb 4-fid, the lobes rounded, the upper somewhat smaller, emarginate, the throat glabrous; stamens 4, didynamous, inserted at the apex of the corolla-tube, included; filaments very short; style glabrous, included; stigma obliquely capitate; fruit dry, dark, ovate, about the size of a mustard seed (Sinapis arvensis), invested by the fruiting-calyx, 2-locular, smooth, glabrous, the cells 1-seeded.

The type of this very handsome species was collected by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Bonpland at an altitude of 2336 meters near Mexico City, Federal District, Mexico, flowering in May, and is deposited in the Humboldt and Bonpland herbarium at the Muséum National d'Histoire Naturelle at Paris, where it was photographed by Macbride as his type photo-

graph no. 39486. The type of L. arborea was collected by José Antonio Pavon, probably in Mexico, although the label is inscribed "Peru", and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. The name, L. gigantea, seems to be based on Herb. W. H. Harvey s.n. [Hort. Daudin, France, 1848] and is deposited in the Dudley Herbarium at Stanford University.

The L. mexicana of Hocking, referred to in the synonymy above, is a synonym of Phyla scaberrima (A. L. Juss.) Moldenke, while that of Moldenke is Lippia tepicana Moldenke; L. callicarpifolia Schau. is a synonym of L. pringlei Briq. The reference, Robinson & Greenm., Garden & Forest 9: 103 & 105, fig. 11", referred to above, is sometimes cited as "Pringle, Garden & Forest 9: 103". Lantana bracteosa Mart. & Gal. and Lippia bracteosa Mart. & Gal. are sometimes included in the synonymy of L. callicarpaefolia — as, for instance, by Standley (1924) — but belong to Lippia bracteosa (Mart. & Gal.) Moldenke, which see. Walpers (1845) reduces L. callicarpaefolia to synonymy under L. umbellata Cav. Schauer (1847) places the species in his Section Rhodolippia, Subsection "A".

The species has been found in oak woods and forests, damp pine and oak forests, open or low spiny deciduous woods, damp quebradas, dry spots, and rocky rubble at the base of waterfalls in canyons, at the edges of oak forests, ar- on bushy or brushy hillsides, bushy or thickety slopes, mountain or bracken slopes, rocky slopes in oak forests, exposed open slopes, hills and dry rocky hills, barrancas and the slopes of barrancas, at altitudes of 500 to 3000 meters, flowering from October to March and in May, fruiting in November and December.

Hinton describes the plant as "not very frequent" in Guerrero, where Frye reports that the plants are cropped by livestock. Hegi (1927) says that it "wird wie Salvia benutzt". Seymour (1929) affirms that it is infested by the fungi Prospodium lippiae (Speg.) Arthur, Puccinia lippiae Speg., and Uredo lippiae Speg. Common names reported for it are "rosa cimarona", "rosa de castilla cimarrona", and "salvia real". Leon Alvarez (1941) states that it has estrogenic action like that of Salvia officinalis L.

The flowers are described as "pale-yellow" on P. C. Standley 58896, "yellow" on Steyermark 31462, "orange" on Hinton 11156 & 14868, "whitish turning brown" on Steyermark 33914, and "purple" on Hinton 11100, 11633, & 12945.

Herbarium material has been misidentified and distributed in herbaria under the names "L. involucratae affinis", L. lupulina Cham., L. umbellata Cav., and Labiatae. On the other hand, the Pittier 4429, distributed as L. callicarpaefolia, is actually L. controversa Moldenke; Purpus 421 is L. hypoleia Briq.; Moritz 1640 is the type collection of L. moritzii Turcz.; Edw. Palmer 479, Pringle 1733 & 2743, Purpus 508 & 8206, and Seler & Seler 4337 are

L. pringlei Briq.; Linden 1141 is L. substrigosa Turcz.; and M. E. Jones 23235 is L. tepicana Moldenke

In all, 97 herbarium specimens and 7 mounted photographs and other illustrations, including type of phototype material of most of the names involved, have been examined by me.

Citations: MEXICO: Federal District: Humboldt & Bonpland s.n. [Macbride photos 39486] (Kr--photo of type, N--photo of type, N--photo of type). Guerrero: Frye & Frye 3133 (G, Se--63348); Hinton 9838 (Au, It, K, Rf, Ur), 11100 (Fs, La, N), 11156 (La), 11302 (G, La, N), 11633 (G, La, N, Rf), 14868 (G, N, N, Rf); Lyonnet & Elcoro 1163 (W--1745973); Mexia 9103a (G, N); H. E. Moore 5567 (G, N); Nuñez s.n. [Huitzuco, 1922] (Me, Me); Rowntree s.n. [near Taxco, Dec. 6, 1938] (Fs); Seler & Seler 4252 (G, Gg--245895); Urbina s.n. [Enero de 1886] (Me). México: Hinton 2620 (A, N, N, N, N), 2989 (A, N, N, N); Matuda 27513 (Cb), 27853 (Cb), 30020 (Ss), 32091 (Ss). Michoacán: Hinton 12383 (G, N, N, Rf), 12945 (G, N, Rf). Morelos: Gold 25880 (Z); E. Lyonnet 2917 (W--1748451); Pringle 6201 (A, Br, C, Ca--104930, Cm, G, Gg--152307, Io--38720, It, Me, Me, Mi, Mn--15410, S, Vt), 11084 (Cm, G, It, N); Schiefer 184 (G, Vi). Vera Cruz: Née 96 (Q). State undetermined: Bartling s.n. (M); C. A. Ehrenberg s.n. (Vt); Haenke 1574 (N); Herb. Meisner s.n. (M); Lemmon & Lemmon 204 (Ca--100955, G); Pavon s.n. ["Peru"] (Cb, N, N--photo, N--photo, Z--photo); Quarles van Ufford 135 (Ut); Sessé, Mociño, Castillo, & Maldonado 2217 (Q), 2220 (Q). GUATEMALA: Baja Verapaz: P. C. Standley 69695 (N). Chimaltenango: P. C. Standley 79841 (N). Chiquimula: Steyermark 30975 (F--1036176), 31462 (F--1047003). Quezaltenango: Hartweg 560 (N); Steyermark 33914 (F--1059351). Sacatepéquez: P. C. Standley 58896 (N). Sololá: P. C. Standley 62750 (N). CULTIVATED: France: Herb. W. H. Harvey s.n. [hort. Daudin, 1848] (Du--166571). MOUNTED ILLUSTRATIONS: Robinson & Greenm., Garden & Forest 9: 105, fig. 11. 1896 (A--drawing).

LIPPIA CAMPESTRIS Moldenke, Phytologia 2: 414. 1948.

Bibliography: Moldenke, Phytologia 2: 414. 1948; Moldenke, Castanea 13: 116. 1948; Moldenke, Alph. List Cit. 4: 1251. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; Stellfeld, Trib. Farmac. 19 (10): 169. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Angely, Fl. Paran. 7: 6, 7, & 12 (1957) and 12: 17. 1958; Moldenke, Résumé 93 & 461. 1959; Angely, Fl. Paran. 16: 60 (1960) and 17: 46. 1961.

Dwarf perennial, woody at the base; stems numerous, simple, 15--17 cm. tall, rather densely glandular-pubescent and also hirsutulous with much longer, divaricate, white, glandless hairs; nodes not noticeably annulate; leaves decussate-opposite, sessile; leaf-blades ovate, 7--16 mm. long, 4--10 mm. wide, the lower pairs increasingly smaller, subacute or obtuse at the apex, roun-

ded or cordate at the base, entire, ciliate, hirsutulous-pubescent on both surfaces and somewhat glandulose beneath; larger venation rather obscure above, very faintly subprominulous beneath; inflorescence axillary, 2 per node, in the median or upper axils; peduncles very slender, 1.5--2.3 cm. long, rather densely glandulose-pubescent and hirsutulous; heads hemispheric, less than 1 cm. long; bractlets ovate, about 5 mm. long, 2 mm. wide at the base, triangular-attenuate at the apex, densely glandular-pubescent and hirsutulous; corolla about 7 or 7.5 mm. long, the tube about equaling the bractlets, unifomly puberulent outside, the limb puberulent on the back, glabrous within.

The type of this species was collected by Per Karl Hjalmar Dusén on a campo at Jaguariahyva, Paraná, Brazil, on October 9, 1911, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The taxon is known thus far only from the type collection. In all, 2 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Paraná: Dusén s.n. [Jaguariahyva, 9.10. 1911] (F--photo of type, N--isotype, N--photo of type, S--type, Si--photo of type, Z--photo of type).

LIPPIA CANDICANS Hayek in Fedde, Repert. Nov. Sp. 2: 86. 1906.

Bibliography: Hayek in Fedde, Repert. Nov. Sp. 2: 86. 1906; Prain, Ind. Kew. Suppl. 4: 142. 1913; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 223 (1946) and 3: 695. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; Moldenke in Dawson, Los Angel. Co. Mus. Contrib. Sci. 7:10 & 11, fig. 2. 1957; Moldenke, Résumé 93 & 461. 1959; Moldenke, Résumé Suppl. 8: 2. 1964.

Illustrations: Moldenke in Dawson, Los Angel. Co. Mus. Contrib. Sci. 7: 10, fig. 2. 1957.

Shrub; branches tetragonal, appressed subsericeous-tomentose; leaves decussate-opposite, petiolate, ovate-lanceolate or lanceolate, acute at the apex, attenuate into the petiole at the base, narrowly crenate-serrate, appressed sericeous-tomentose above and canescent, incanous-tomentose beneath; inflorescences 2 or 3 in the axils of the uppermost reduced leaves, subequaling the subtending leaf, ovoid-globose, 4--5 mm. long; bractlets ovate-triangular, acute at the apex, lightly red-glandulose and appressed-tomentose; peduncles red-glandulose and appressed-tomentose; corolla hypocrateriform, surpassing the subtending bractlet, red-glandular and pilose on the outside.

The type of this handsome species was collected by George Gardner (no. 3942) in Goías, Brazil, and is deposited in the herbarium of the Naturhistorisches Museum in Vienna, where it was photographed by Macbride as his type photograph no. 34329. Hayek (1909) says of it "Affinis L. sericeae Schau., a qua habitu graciliore, indumento breviore adpresso et capitulis minoribus valde differt." The plant has been found growing on sandstone ridges, flowering in April. In all, 3 herbarium specimens, including the type collection, and 3 mounted photographs have been examined by me.

Citations: BRAZIL: Goías: E. Y. Dawson 14695 (Z); G. Gardner 3942 [Macbride photos 34329] (It--photo of type, Kr--photo of type, M--isotype, N--photo of type). Minas Gerais: Heringer 3789 (B).

LIPPIA CARDIOSTEGIA Benth., Bot. Voy. Sulphur 153--154. 1846.

Synonymy: Lippia brenesii Standl., Field Mus. Publ. Bot. 18: 1009. 1938.

Bibliography: Benth., Bot. Voy. Sulphur 153--154. 1846; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; P. C. Standl., Field Mus. Publ. Bot. 18: 1009. 1938; Moldenke, Alph. List Common Names 23. 1939; B. H. Davis, Mycologia 32: 170. 1940; Moldenke, Phytologia 2: 21. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20--23, & 95. 1942; Anon., Homenaje al Prof. A. M. Brenes 3. 1944; Moldenke, Phytologia 2: 70 & 107. 1945; Moldenke, Alph. List Cit. 1: 23, 24, 192, & 224. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Invalid Names 13. 1947; Moldenke, Phytologia 2: 331 & 384. 1947; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 44. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 51. 1948; Moldenke, Alph. List Cit. 2: 351, 390, 408, 469, 478, 536, 549, & 606 (1948), 3: 657, 714, 817, 819, 821, 946, 958--962, & 973 (1949), and 4: 999, 1001, 1176, 1180, 1186, 1187, 1227, & 1296. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35, 37--39, & 189. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Matuda, Am. Midl. Nat. 44: 576. 1950; Moldenke, Phytologia 3: 451. 1951; Calpouzos, Econom. Bot. 8: 228. 1954; Moldenke, Résumé 37, 42, 44, 45, 47, 311, & 461. 1959; Moldenke, Résumé Suppl. 2: 4 (1960), 3: 10 & 11 (1962), and 11: 4. 1964.

Suffrutescent bush, shrub, or tree, 1--5 m. tall, densely and strictly branched, strong-scented with a pungent marigold (Tagetes) odor; stems slender, arching; bark pale-gray or gray, smooth and glabrous; branchlets slender, rather densely strigose with short whitish hairs; principal internodes short or elongate; leaves decussate-opposite, the larger ones petiolate; petioles slender, 5--14 mm. long, strigillose-scabrous; leaf-blades subcoriaceous, somewhat stiff, opaque green above, paler beneath, broadly elliptic to ovate, sometimes oblong-ovate, 3--6.5 cm. long, 1.5--4 cm. wide, shortly acuminate to obtuse at the apex, cuneate-acute or attenuate at the base and often contracted-decurrent into the petiole, closely serrate or crenate-serrate along the margins, roughly scabrous and densely white-punctate above, often subbullate because of the impressed venation, scabrous and very rough beneath, with the midrib and veins very prominent; secondaries about 6 per side; inflorescence capitate, 2--6 per node; peduncles slender, 1--2.5 cm. long, strigillose-scabrellous; heads in the fruiting condition scarcely elongate, globose, 8—10 mm. wide; bractlets small, chartaceous, green or brown, broadly ovate, acute or subacuminate at the apex, scabrous or glabrate, to 6 mm. long in the fruiting stage, scarcely enlarged; perianth not surpassing the bractlets; calyx compressed, 2-

dentate, scarcely more than 1 mm. long, densely white-pilosulous; corolla hypocrateriform, white or greenish-white to pale greenish-yellow, about 3 mm. long, the tube slender, glabrous on the outer surface, the limb 1.5 mm. wide, the lobes broadly rounded, densely puberulent on the outer and sparsely puberulent on the inner surface.

The type of this species was collected at the "Gulf of Fonseca", between Honduras and El Salvador [not "Mexico" as stated in the Index Kewensis!] and is deposited in the Bentham Herbarium at the Royal Botanic Gardens, Kew. The type of L. brenesii was collected by Alberto Mora Brenes (no. 6477) along the Camino de San Gerardo, Santiago de San Ramon, Costa Rica, in December, 1928, and is deposited in the herbarium of the Chicago Natural History Museum.

Lippia cardiostegia has been found growing on hills, dry rocky and brushy rocky slopes, brushy and dry or damp brushy slopes, and green grassy open slopes, in hedges and thickets, dry or grassy thickets, damp or wet thickets, rocky fields, dry forests, border growths and shrubbery, at 150 to 1800 meters altitude, flowering from August to May, fruiting from October to February and in May. Stork & Horton found it growing in shade in thick black soil on lava in El Salvador, while A. Smith encountered it in the Pacific tropical zone in dry secondary growth, nearly open exposure, on clay loam soil in Costa Rica. Standley calls it "common" in Guatemala, and C. L. Smith refers to it as "plentiful around base of hills or peaks" in Nicaragua. The specific name is sometimes uppercased for no valid reason. Common names reported for it are "chiligua", "coronchoch", "oreganillo", "oregano montes", and "orégano montés". The name "oreganillo" is also applied to L. graveolens H.B.K., L. myriocephala Schlecht. & Cham., and L. umbellata Cav.

The Kellerman s.n. [Laguna, January 20, 1906] is the type host collection for the fungus Cercospora cardiostegiae B. H. Davis. C. F. Baker 206 in the Britton Herbarium has the spikes abnormally elongated. Matuda 743 gives no indication on its label as to the exact locality of its collection, but it probably was gathered in Chiapas. Some collectors refer to the leaves of this species as "membranous", but this is a palpable error, since they are conspicuously subcoriaceous.

Herbarium material has been misidentified and distributed in herbaria under the names L. asperifolia Rich., L. myriocephala Cham. & Schlecht., L. umbellata Cav., and Lantana involucrata L. On the other hand, the M. C. Carlson 1648, distributed as Lippia cardiostegia, is actually L. bracteosa (Mart. & Gal.) Moldenke.

Standley (1938) says "Material of this plant has been referred previously to L. myriocephala Schlecht. & Cham., from which it is amply distinct, and to L. asperifolia Rich." He cites the following collections from Costa Rica, not as yet seen by me: Brenes 5855, Pittier 7519, P. C. Standley 41349, Tonduz 13631,

and M. Valerio 1521, presumably in the herbarium of the Chicago Natural History Museum.

In all, 103 herbarium specimens, including the type collection of L. brenesii, have been examined by me.

Citations: MEXICO: Chiapas: Matuda 743 (Mh, Mi, N, N), 938 (Mi, N), 1670 (A, Mh, Mi, N, N, N). GUATEMALA: Chiquimula: P. C. Standley 74739 (N); Steyermark 30305 (F—1056265), 30569 (F—1052041). Escuintla: P. C. Standley 60217 (A, N). Guatemala: P. C. Standley 61418 (N). Huehuetenango: Steyermark 50770 (N). Jutiapa: P. C. Standley 75004 (N), 75922 (N). Santa Rosa: Heyde & Lux 4385 (G); P. C. Standley 60713 (N), 77708 (N), 78412 (N), 78809 (N). Suchitepéquez: P. C. Standley 62061 (N). Department undetermined: Friedrichsthal 148 (V), 878 [Mniogalpa] (V), 1118 [Lapunte] (V, V), s.n. [1841/XIV] (V, V, V); Kellerman s.n. [Laguna, January 20, 1906] (N, N). HONDURAS: Gracias: Hjalmarson s.n. [1852] (S). EL SALVADOR: Ahuachapán: P. C. Standley 19860 (G, S), 20222 (G, N). La Libertad: Stork & Horton 8646 (Ca—643478). La Unión: P. C. Standley 20803 (G, N). San Salvador: Herb. Lab. Químico 14 (N); P. C. Standley 22677 (G, S), 23262 (G, S). Sonsonate: C. V. Hartman 134 (S). Department undetermined: Kovar 1090 (N, Rf). NICARAGUA: Carazo: N. L. H. Krauss 381 (Z). Chinandega: C. F. Baker 13 [766] (Ca—199193, Du—76202, Gg—31150, Mi, N, Po—64698, W—862825). Grenada: C. F. Baker 206 [660] (G, N, Po—64697); Lévy 241 (Cb, N). Managua: Garnier 264 (Mi), 641 (I, N, N), 1004 (Mi); C. L. Smith 108 (Ca—975391, G, N, N, N, Tl, Vt). Ometepe Island [Rivas]: Shimek & Smith 8 (Ca—975390). COSTA RICA: Alajuela: Brenes 14 (N), 4756 (N), 6477 [332] (N), 13238 [255; 13358] (N, N), 14339 [20] (N, N), 17509 (N); A. Smith P.2346 (A, Ca—12709). Cartago: Brenes s.n. [San Mateo, 1903] (N); H. Pittier 2519 [Herb. Instit. Physico-geogr. Nat. Costaric. 13215] (C, G). Puntarenas: Holm & Iltis 313 (N). San José: Biolley & Tonduz 7218 (Br); Brade 2135 (Br); H. Pittier 602 (Br), 7218 (Br), 8452 (Br); Tonduz 1460 (Br, Br), 3159 (Br); Tonduz & Pittier 8452 (Br). Department undetermined: H. Pittier s.n. (Br).

LIPPIA CARVIODORA Meikle, Kew Bull. 1948: 467—468. 1949.

Bibliography: Meikle, Kew Bull. 1948: 467—468. 1949; Moldenke, Phytologia 3: 137. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 118 & 189. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 146 & 461. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 790—791. 1962; Moldenke, Résumé Suppl. 11: 7. 1964.

Sweet-smelling subshrub, to 1.5 m. tall, many-branched; bark striate, at first pale, later gray or dark-brown; branches spreading-erect, very slender, purplish when young, subterete or

obtusely tetragonal, sparsely pubescent, finally glabrescent, densely covered with shiny glands; leaves decussate-opposite, spreading, short-petiolate; petioles slender, about 1 cm. long, pubescent, canaliculate above; leaf-blades ovate, to 2.5 cm. long and 1.7 cm. wide, gray green, obtuse at the apex, subtruncate at the base and gradually narrowed into the petiole, rarely shortly decurrent, crenate or obtusely serrate along the margins, rugose and venose above, appressed-pubescent and sparsely glandulose above, densely canescent-puberulent beneath and covered with shiny glands; inflorescence axillary, solitary, short-pedunculate, the spikes short, abbreviated, strobiliform, and about 12-flowered; peduncles slender, to 7 mm. long, densely white-tomentose; spikes to 5 mm. long and 7 mm. wide; bractlets during anthesis ovate-lanceolate, 4 mm. long and 2 mm. wide, acuminate at the apex, densely glandulose, sparsely white-pilose, after anthesis greatly enlarged, finally membranous, venose, hirtellous, erose along the margins, acute at the apex, cordate at the base, to 8 mm. long and 15 mm. wide, resembling the strobilus of Humulus lupulus; calyx minute, to 1 mm. long and wide, membranous, densely white-hirsute, divided into 2 obtuse or emarginate lobes, enlarged after anthesis and entirely covering the fruit; corolla equaling or slightly surpassing the bractlets, the tube to 4 mm. long, rather dark, striate, subglabrous at the base outside, sparsely pilose above, the lobes 4, rounded, whitish, incurved, undulate and crenulate along the margins, livid-annulate in the throat within; stamens 4, didynamous, two inserted in the upper part of the corolla-tube and slightly exserted, the other 2 inserted at the middle of the tube; filaments very short; anthers ovate, 2-celled; style to 2.3 mm. long; stigma obliquely declined, rather thick, truncate or subemarginate at the apex; ovary subglobose, 2-celled, about 1 mm. wide; fruit small, to 3 mm. wide, compressed-globose, dry, included by the tomentose fruiting-calyx and terminated by the shriveled corolla, splitting into 2 nutlets; pericarp dark.

The type of this distinct species was collected by Gilbert Walker at Wamba, in the Northern Frontier District, Kenya, on January 4, 1948, and is deposited (dried and alcoholic material) in the herbarium of the Royal Botanic Gardens at Kew. Meikle (1949) says "sectioni Rhodolippiae ut videtur affinis, ab aliis speciebus africanis valde dissimilis.....This is a very distinct species, quite unlike any other African Lippia, but bearing a close superficial resemblance to Lantana petitiana A. Rich. with which it has in the past been occasionally confused; the short peduncles, small flowers, large membranous, hop-like fruiting bracts and dry fruits distinguish it from this plant." The only vernacular name recorded for it is "ged-hamer".

Only 2 herbarium specimens, including type material, and 1 mounted photograph have been examined by me.

Citations: KENYA: Jeffrey S.N.2 (S); G. Walker s.n. [Wamba, 4.1.1948] (N--isotype, N--photo of type).

LIPPIA CARVIODORA var. MINOR Meikle, Kew Bull. 1948: 468--469. 1949.

Synonymy: Lantana microphylla Hutch. & Bruce ex Meikle, Kew Bull. 1948: 468, in syn. 1949 [not L. microphylla Cham., 1947, nor Franchet, 1882, nor Mart., 1828, nor Peter, 1959]. Lantana petitiana Glover ex Meikle, Kew Bull. 1948: 468, in syn. 1949 [not L. petitiana A. Rich., 1851].

Bibliography: Meikle, Kew Bull. 1948: 468--469. 1949; Moldenke, Phytologia 3: 136 & 137. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 110, 118, & 189. 1949; Moldenke, Résumé 135, 146, & 461. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 791. 1962; Moldenke, Résumé Suppl. 11: 7. 1964.

This variety differs from the typical form of the species in having paler branches and smaller leaves and bractlets, the leaves mostly rounded, to 1.5 cm. long and 1 cm. wide, and the bractlets scarcely membranous, subobtuse at the apex, about 5 mm. long and 7 mm. wide, pubescent, entire and often recurved along the margins.

The type of this variety was collected by Major D. Thomson (no. 72) in Sheikh Pass and Maritime Plain, British Somaliland, and is deposited in the herbarium of the Royal Botanic Gardens at Kew, where it was received on January 26, 1904. Meikle (1949) notes that "The var. minor, with pale whitish bark, small leaves and fruiting bracts, looks distinct, but some specimens (e.g., Bally 3029 and Edwards 2984) approach typical L. carviodora, and it may be merely a starved or desiccated state of this species. The whole plant emits a powerful odour reminiscent of Caraway-seed (especially noticeable in the var. minor), and is said to be used by the Somalis as a substitute for tea." Vernacular names recorded are "ged hamar", "ged-hamar", "ged hamer", and "ged-hamer."

The Lantana microphylla of Chamisso, referred to in the synonymy above, is a synonym of Lippia microphylla Cham., that of Franchet is Lantana petitiana A. Rich., that of Martius is Verbena microphylla H.B.K., and that of Peter is Lantana rugosa var. tomentosa Moldenke.

Meikle cites also Gillet 4373, Bally 3029, and Glover & Gilliland 48 from British Somaliland, and D. C. Edwards 2984 from Kenya. Bally describes the plant as "very common.....in semi-desert scrub" at 400 meters altitude and describes the plant as a shrub about 12 dm. tall. It has been collected in flower in September, October, January, and March. Thus far I have seen only a single phototype.

Citations: BRITISH SOMALILAND: D. Thomson 72 (N--photo of type).

LIPPIA CENTAUREA A. Chev., Étud. Fl. Afr. Cent. Franç. 1: 242, hyponym. 1913.

Bibliography: A. Chev., Étud. Fl. Afr. Cent. Franç. 1: 242. 1913; Prain, Ind. Kew. Suppl. 5: 153. 1921; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 48 & 95 (1942) and [ed. 2], 114 & 189. 1949; Moldenke, Résumé 140 & 461. 1959.

All that is known about this mysterious plant is what is stated by Chevalier, who bases the name on his no. 10932, which was collected in clearings at Bangui, Middle Ubangi, Ubangi-chari, Central African Republic, on December 18, 1903. He describes its inflorescences as white, but gives no further description.

LIPPIA CHACENSIS Moldenke, Phytologia 2: 414--415. 1948.

Bibliography: Moldenke, Phytologia 2: 414--415. 1948; Moldenke, Lilloa 14: 41. 1948; Moldenke, Castanea 13: 117. 1948; Moldenke, Alph. List Cit. 4: 1293. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97 & 189. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 114 & 461. 1959.

Shrub, 6--7 dm. tall; stems slender, obtusely tetragonal, canescent-puberulent, strigillose on the older parts; nodes rather indistinctly annulate; branches apparently few and short; leaves decussate-opposite, abundant; petioles very slender, 2--6 mm. long, densely canescent-strigose; leaf-blades thin-chartaceous, lighter beneath, narrowly elliptic, 2--6 cm. long, 5--15 mm. wide, acute at the apex, uniformly serrulate along the margins to below the middle, attenuate or subacuminate at the base, densely appressed-strigillose above, very densely velutinous with very short flavescent hairs beneath; the slender midrib and 5 or 6 pairs of secondaries, and often the larger veinlets, slightly subimpressed above, prominulous beneath; inflorescence axillary, 1 or 2 per node, shorter than the subtending leaves; peduncles very slender, 1--1.5 cm. long, canescent-strigillose; heads hemispheric or oblong, to about 1 cm. long; bractlets broadly ovate, 4--4.5 mm. long, about 2 mm. wide at the base, acuminate at the apex, densely strigose or strigillose, canescent, glandulose; corolla-tube about 6 mm. long, very densely strigose on the outside, the limb about 4 mm. wide, glabrous or slightly pubescent at the base.

The type of this species was collected by Klas Robert Elias Fries (no. 1445) in an open grassy campo at Tatarenda, Gran Chaco, Santa Cruz, Bolivia, on March 22, 1902, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The collector describes the species as "rare" and the flowers as "lividis". It is known thus far only from the type collection and was originally misidentified as and distributed under the name L. geminata H.B.K.

In all, 2 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BOLIVIA: Santa Cruz: R. E. Fries 1445 (F--photo of type, N--isotype, N--photo of type, S--type, Si--photo of type, Z--photo of type).

LIPPIA CHEVALIERII Moldenke, Phytologia 2: 313--314. 1947.

Bibliography: Moldenke, Phytologia 2: 313--314, 339, & 340 (1947) and 3: 136. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 109, 111, & 189. 1949; Moldenke, Alph. List Cit. 4: 1197

& 1201. 1949; Moldenke, Phytologia 3: 291. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 133, 135, 136, & 461. 1959.

Herbaceous (?); branches very slender, stramineous, subterete, striate, rather obscurely strigillose; nodes annulate; principal internodes elongate, 5--13 cm. long; leaves ternate or in 4's.

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## BOOK REVIEW

Alma L. Moldenke

"A Selected Guide to the Literature on the Flowering Plants of Mexico", by Ida Kaplan Langman, 1015 pp. University of Pennsylvania Press, Philadelphia, Pennsylvania. 1964. $25.00

Back in 1948, when my husband and I were visiting Mexico's Instituto de Biologia, we first met Mrs. Langman as she was industriously starting this useful bibliographic contribution to botanical literature. The idea for this work started its gestation in 1941 when Mrs. Langman first visited Mexico and turned to the libraries there for reference material about its plant life. She has been working diligently ever since in the leading libraries of Mexico and the United States, and so has been able to produce this magnificent compilation of the literature on Mexican flowering plants, their description, their taxonomy, their phytogeography, their economic importance, their mention in books of travel, their indigenous names in various local languages, and their role in the history of botany -- surveying a tremendous field of printed and manuscript information over a long period of time.

We have pointed out a few errors to the author, and she has directed our attention to a few more. They seem virtually impossible to avoid in a work encompassing so many details from so many different sources. Since the publisher has offered to print a list of errata soon for distribution with the book there is no point in listing them here. I use the word "author" advisedly because this book is much more than a mere compilation; there are thousands of succinct, valuable comments on the inclusions.

Both reading and hunting in this work are easy because the print is clear and of a suitable size and format. The index alone covers 157 pages of four columns each.

So many present and future botanists and other researchers referring to this book will be ever so much in the author's debt because of all the sources made so readily available here, all the new vistas opened, and all the time subsequently saved.

The University of Pennsylvania Press is to be congratulated upon choosing to make this work available to readers, and the author for her persevering dedication.

# PHYTOLOGIA

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# DISTRIBUTION OF SALVINIA AND AZOLLA IN SOUTH AMERICA AND AFRICA, IN CONNECTION WITH STUDIES FOR CONTROL BY INSECTS

Clyde F. Reed[1/]

In 1961, Dr. Fred D. Bennett, Commonwealth Institute of Biological Control, Trinidad, W.I., made observations on the insects attacking Salvinia spp. in British Guiana and North Brazil. In 1963, he made another trip to South America and made observations in Brazil (Belem, Recife, Rio de Janeiro, Sao Paulo, Curitiba, Porto Alegre, Pelotas, Obidos and Manaus) and in Uruguay (Fuerte de San Migual near Chuy). From October to December, 1964, Dr. Bennett conducted feeding tests with insects attacking Salvinia auriculata at Belem, Brazil.

The ultimate aim of these investigations by Dr. Bennett was to obtain some organism capable of effecting control of Salvinia auriculata in Kariba Lake, in South Rhodesia, Africa. An editorial, entitled "Weed Helps River Fight Zambezi Power Dam", in the Baltimore Evening Sun (p. 3, Nov. 18, 1961), released by the Associated Press, recalls the old African legend that the great Zambezi River could never be conquered. Shortly after the engineers had blocked the Zambezi River with the Kariba Dam to create a huge lake to store hydroelectric power and to provide a sportsmans paradise, the Zambezi River began feeding Salvinia auriculata into the Kariba Lake. Salvinia was first found in the lake early in 1959 and by 1961 it had covered 200 of the lakes 1500 square miles. The article states that this small plant (a surface floating plant, with leaves about one inch in diameter, the leaves connected in chains as long as three feet) clogs boat propellers, kills fish and could eventually turn the lake into a swamp, since it is so thick in places that a man can walk on it and trees and shrubs can grow on it. Salvinia was first discovered in this area of Africa near Victoria Falls in 1949 and was identified at that time as the harmless species, Salvinia hastata.

In South America, Dr. Bennett found that huge areas of lakes and reservoirs and other sources of drinking water are being covered by Salvinia auriculata. Also water-ways are being clogged by Pistia stratiotes L., Eichhornia crassipes Solms and Alternanthera philoxeroides Griseb. There, these species, although not entirely held in check by insect enemies, do have a

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1/ Botanist, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Maryland, and Reed Herbarium, Baltimore, Maryland.

complex of insects which attack them and which in turn are attacked by parasites and predators. In the various reports from 1961 to 1965, Dr. Bennett found that there are four species of insects that feed on Salvinia and appear by their feeding habits or by their biology to be restricted to an aquatic environment. These are Paulinia acuminata (DeGeer) (Acrididae; Pauliniidae by some authors), Cyrtobagous singularis Hust. (Curculionidae), Samea multiplicalis (Guenée) (Pyraustidae) and Lipostemmata purpurata (Distant) (Lygaeidae). Esuris is a synonym of Lipostemmata.

Paulinia acuminata normally attacked Salvinia auriculata and Pistia stratiotes around Belem. In Trinidad adults were found on Lemna and Azolla, as well as Salvinia and Pistia. In Uruguay, Carbonell (1964) reported this species on Azolla filiculoides Lam., as well as Hydromysteria stolonifera F.G.W.Mey. (Hydrocharitaceae), Spirodela intermedia W. Koch and Salvinia auriculata. In the laboratory this insect also attacked Eichhornia crassipes and Nymphaea sp., and to a limited extent a species of Commelina.

Samea multiplicalis was found to attack Pistia stratiotes in the field in Trinidad, British Guiana and Brazil. In the laboratory it also laid eggs on Salvinia and Pistia, and the larvae fed mainly on Eichhornia crassipes. Those feeding on Lemna died in six days.

Cyrtobagous singularis is known from Corumba, Matto Grosso (S.W. Brazil, orig. loc.), British Guiana and Recife (found on Salvinia). This species seems to prefer Salvinia; it does not attack Pistia or other aquatic plants; and the larvae did not feed on and died within seventy-two hours when placed among roots of Pistia and Eichhornia. Lipostemmata purpurata was not used in the tests at Belem.

The tests conducted at Belem in 1964 indicate that Paulinia acuminata and Samea multiplicalis do little or no damage to the crop plants tested at the same time (rice, lucerne, watercress, cotton and sugarcane). Hence, introduction of these species of insects into the Kariba Lake would not endanger any agricultural crops either near the lake or farther down the watercourse. Cyrtobagous singularis appears to be very restricted on its feeding habits and is recorded as having destroyed stands of Salvinia in small ditches near Georgetown, British Guiana.

My interest in this project has been the identification of the various specimens of Salvinia and Azolla found by Dr. Bennett in his investigations. Many new localities for these genera in South America now may be recorded, based upon his collections in Trinidad, Brazil, Uruguay and British Guiana. Since Dr. Bennett's studies were being made in conjunction with control of Salvinia

auriculata in Africa, specimens were also sent to me by the Kariba Lake authorities for identification. Additional records for some of the species concerned, represented in the Reed Herbarium, are also included.

In South America three species of Salvinia are frequently confused, namely, Salvinia auriculata Aubl., Salvinia radula Baker and Salvinia rotundifolia Willd. Frequently, S. auriculata and S. radula are found growing together. However, S. radula and S. rotundifolia rarely form extensive mats, as S. auriculata usually does. Also the leaves of S. radula and S. rotundifolia are half the size of those of S. auriculata. Weatherby (1937) pointed out the differences among these three species, indicating that the taxonomy had become quite entangled and confusing. He discussed the problems and indicated the following characteristics as clarifying the species.

Salvinia rotundifolia Willd. -- Floating leaves comparatively thin, average 1 cm. in diameter and drying dull green; some gradation from small, flat leaves to much larger, folded leaves, without any reduction in papillae or addition in development of supplementary trichomes in the smaller, flatter leaves; the regular rows of elongated conical protuberances with four jointed hairs, which are wholly free and somewhat spreading; the hair-tips tapering and colorless; sporocarps containing the macrospores sessile.

Salvinia auriculata Aubl. -- Floating leaves thick, boat-shaped or conduplicate, prevailingly widest at the broadly cordate base, distinctly broader than long, ordinarily 1.5-3 cm in diameter, becoming yellowish or brownish when dried; the regular rows of elongated conical protuberances with four jointed hairs, which, though otherwise free, are grown together at their tips, the terminal cells being united into a relatively thick dark-colored body, and, unless broken, remains so until entirely withered; papillae well-developed, 1 mm. or more high in the center of the leaf; leaf-tissue usually glabrous between the papillae; sporocarps containing the macrospores stalked.

Salvinia radula Baker -- Floating leaves flat, averaging much smaller than in S. auriculata, broadly elliptic or oblong-elliptic to obovate, widest at or above the middle; papillae low or sometimes nearly obsolete; leaf-tissue often with single trichomes between the rows of papillae. Other than these characteristics, none of which are based on the structure of the fruiting bodies, S. radula appears to be a shade-form of S. auriculata, as suggested by Weatherby. Some specimens appear intermediate between it and S. auriculata. None of the specimens I have studied listed below are fruiting, and most of them were collected in shaded areas, or completely intermingled with

S. auriculata, which could provide a shade situation by itself. The geographic ranges for S. auriculata and S. radula completely overlap in South America, and all the specimens of S. radula I have seen in this study have occurred with or very near S. auriculata. When the complete life cycle of S. auriculata is thoroughly studied, S. radula may prove to be nothing more than a growth phase in its life cycle.

## Salvinia auriculata Aubl.

TRINIDAD: #3. Collected in the sea, Balandra Bay, Trinidad, W. I Sept. 8, 1961. Small quantities of Salvinia have been noted on beaches on the east coast of Trinidad on several occasions recently. I have not discovered the source of this material, but it may be washed out to sea from the Oropouche Swamp in Trinidad, or conceivably from the Orinoco River in Venezuela. F.D.Bennett. (Reed Herb. 39379).

#4. Collected from the "Old Pond", St. Mary's Estate, Bonasse in Southern Trinidad. Aug. 27, 1961. This pond of considerable size many years ago, is now overgrown with grass; small quantities of Salvinia being present. F.D.Bennett. Herb. Trin. No. 16405. (Reed Herb. 39380).

#2. Botany Greenhouse tank. July 15, 1961. W.D.Richardson. Herb. Trin. No. 16271. (Reed Herb. 38782).

BRITISH GUIANA: #10. Botanic Gardens, Georgetown. Oct. 11, 1961. Drainage trench. Sporocarps present. F.D.Bennett. (Reed Herb. 39931). #14. Canals and ditches, same loc. Oct. 13, 1961. F.D.Bennett. (Reed Herb. 39928); #16. Same loc. Oct. 15, 1961. F.D.Bennett. (Reed Herb. 39926; US).

#12 and #15. Canals, Ogle Sugar Estates, about 5 mi. from Georgetown. Oct. 12, 1961. F.D.Bennett. (Reed Herb. 39934 and 39927).

BRAZIL: #19. Belem, Inst. Agron. Small stream. Oct. 20, 1961. F.D.Bennett. (Reed Herb. 40342); #25. Large pond No. 1, surface about 2 acres completely covered. Oct. 25, 1961. F.D.Bennett. (Reed Herb. 40352 and 40353; US); #27. In drainage ditch. Oct. 27, 1961. F.D.Bennett. (Reed Herb. 40350); #26. Large pond, along edge. Oct. 26, 1961. F.D.Bennett. (Reed Herb. 40349). #37. Belem, Inst. Agron. do Norte. May 1963. Sporocarps abundant. F.D.Bennett. (Reed Herb.).

Belem. Museu Goeldi, Para. #21. Artificial pond. Oct. 21, 1961. F.D.Bennett. (Reed Herb. 40343); #18. Artificial fish tank. Oct. 18, 1961. F.D.Bennett. (Reed Herb. 40344); # 23.

Artificial pond. Oct. 22, 1961. F.D.Bennett. (Reed Herb. 40351); #24. Artificial pond. Oct. 23, 1961. F.D.Bennett. (Reed Herb. 40348); #43. In tanks, sporocarps present. Feb. 1963. F.D.Bennett. (Reed Herb.); #38. In pond. April 1963. F.D.Bennett. (Reed Herb.).

Rio de Janeiro, Botanic Gardens. #29. Ponds. Nov. 4, 1961. F.D.Bennett. (Reed Herb. 40345); June 12, 1940. J.G. Kuhlmann 6042. (Reed Herb. 39062); #35. In swampy area in pasture field near Universidad Rural "Km 47", Rio de Janeiro. Mar. 1963. F.D.Bennett. (Reed Herb.).

Curitiba, Parana. #33. In small lake. Mar. 26, 1963. F.D.Bennett. (Reed Herb. 45291).

#28. Museu Nacional, Quinta Boa Vista, small concrete ponds, Rio de Janeiro. Nov. 3, 1961. F.D.Bennett. (Reed Herb. 40347).

Sao Paulo. #34. In small lake about 1 mi. from Institute Butantan. Mar. 20, 1963. F.D.Bennett. (Reed Herb.); in garden pool in garden of director, Instituto de Botanico, Parque de Estado. Nov. 1961. F.D.Bennett. (Reed Herb. 35321).

Recife. #36. In pond in Recife, Pernambuco. Sporocarps present. Fungus fructifications on the leaves. Feb. 1963. F.D.Bennett. (Reed Herb. 45292).

Porto Alegre to Pelotes. #32a. In rice growing in ditches. Apr. 9, 1963. F.D.Bennett. (Reed Herb. 54725).

Obidos. #45 and 46. In Lake Maraurú. Sporocarps present. Apr. 1963. Azolla filiculoides also present. F.D.Bennett (Reed Herb. 45289).

Manaus, Amazonas. #50 and 52. In small cross channel between Rio Negro and Rio Solimoes. May 1963. F.D.Bennett. (Reed Herb. 45290).

ZAMBIA (Northern Rhodesia): Floating, very abundant in Zambezi at Katambora, Dist. Katambora. Nov. 5-11, 1949. O.West 3050. (Reed Herb. 42764; GHSR-34026); upstream end of Kandakan Island, near Victoria Falls, Dist. Livingstone. July 25, 1958. G.F. Cunningham van Someren. (Reed Herb. 42766; GHSR-87309); floating, forming extensive mats on surface; acres of surface covered. Estuary of the Chibuwe River, Lake Kariba, Southern Province. A.Angus 2221. (No date). (Reed Herb. 42743); Kazungula, Zambezi River, Southern Prov. Apr. 11, 1955. A.W.Exell, F.A.Mendonca & H.Wild 1457. (GHSR); Chesia Estuary, Kariba Lake, abundant aquatic weed. Aug. 4, 1960. J.B.Phipps 2810. (GHSR).

RHODESIA (Southern Rhodesia): Kariba Lake, Lat. 17°S - Long. 28°E. Sample sent to Bennett by Kariba Lake Authorities. (#6). Aug. 1961. (Reed Herb. 39375, 39376, 39377, (39378 in US); a very recent introduction, floating in dam, Dist. Salisbury. Dec. 16, 1954. H.Wild 4667. (Reed Herb. 42762; GHSR); on water in flooded mouth of Bumi River, which enters Lake Kariba, Dist. Kariba, elev. 1500 ft. July 1960. B. Goldsmith 92/60. (Reed Herb. 42763; GHSR); Victoria Falls, rapidly colonizing areas under permanent spray-action in actual water. Dist. Wankie. Oct. 22, 1959. H.Wild 4851. (GHSR); floating water plant, Zambezi near Flying Boat Landing Stage, Victoria Falls. Oct. 20, 1954. O.West 3234. (GSR); aquatic floating weed in masses, Zambezi River, Dist. Wankie, Victoria Falls. Mar. 3, 1955. N.C.Chase 5773. (GHSR): Park River, Umtali, Dist. Umtali, alt. 3600 ft. Aug. 22, 1955. N.C.Chase 5730. (GHSR); aquatic herb floating in pool, Umtali, Dist. Umtali, alt. 3600 ft. Aug. 6, 1952. N.C.Chase 4615. (GHSR-note by Alston, "native of America", Nov. 6, 1953); abundant on drying one acre dam at Schanara farm near Odzi and on a small dam at Alma farm near Odzi, also about 11 mi. west of Odzi, Dist. Umtali, alt. 3300 ft. Aug. 20, 1959. J.B.Phipps 3171. (GHSR); on bank at mouth of Sengave, Kariba Dam, a floating plant forming dense mats in protected areas, abundant, alt. 1500 ft. Sept. 1, 1960. D.S.Mitchell 580. (GHSR); floating down the Zambezi, at Chirundu since Kariba flow increased about 10 days ago, Dist. Urungwe. July 16, 1959. G.R.Bates 97192. (GHSR); Harleigh Farm (E.C.Harrington), Silverbow Road, Rusape, planted in irrigation dam, Dist. Makoni. March 1957. H.Booy 74372. (GHSR).

CAPE PROVINCE: Kuysua, Gouna Forest Preserve, introduced, abundant in pool near the preserve. Apr. 1957. D.S.Mitchell 190. (GHSR).

## Salvinia radula Baker

TRINIDAD: Floating in Botany Pond, Trinidad. July 15, 1961. W.D.Richardson. Herb. Trin. No. 16272. Alt. 100 ft. (Reed Herb. 38781).

BRITISH GUIANA: #9. Botanic Gardens, Georgetown. Drainage trench, juvenile plants. Oct. 11, 1961. F.D.Bennett. (Reed Herb. 39930); #13. Canals, ditches and ponds. Oct. 13, 1961. F.D.Bennett. (Reed Herb. 39929). #11. Ogle Sugar Estates, about 5 mi. from Georgetown. Oct. 12, 1961. F.D.Bennett. (Reed Herb. 39932). Azolla filiculoides also present. #17. Mon Repos Estate, Dept. of Agric. Oct. 16, 1961. F.D.Bennett. (Reed Herb. 39935). Azolla filiculoides also present. Basin of Rupununi River, floating on swampy lake, in flooded forest, Karenambo. Oct. 9-13, 1937. A.C.Smith 2229. (Reed Herb. 39061).

BRAZIL: #42. Belem, in pond at Museu Goeldi. Apr. 1963. F.D. Bennett. (Reed Herb. 45293). #44. In Lake Maraurú, about 15 miles from Obidos. Apr. 1963. F.D.Bennett. (Reed Herb.). #47 and 48. Same loc. Mixtures of S. radula and S. auriculata. (Reed Herb.).

## Salvinia rotundifolia Willd.

BERMUDA: #5. Collected from an unspecified location in Bermuda by I.W.Hughes, Dept. Agr., Hamilton. Aug. 1961. (Reed Herb. 39381; US).

BRAZIL: Rio de Janeiro, Catumby, in stagnant water. Oct. 15, 1874. J.G.Mosén 2738. (Reed Herb. 39060).

Pelotas, R.G.S. #31. Collected in small pond near Inst. Agron. do Sul. Apr. 8, 1963. F.D.Bennett. (Reed Herb.); #32. Collected in rice growing area between Pelotas and Porto Alegre, R.G.S. Apr. 9, 1963. In ditches. F.D.Bennett. (Reed Herb.).

Belem. Museu Goeldi. #39 and 40. In small tanks. Feb. 1963. Sporocarps present. F.D.Bennett. (Reed Herb.); #41. Same loc., collected by Dr. Paulo Cavalcante. Mar. 23, 1963. Sporocarps abundant. (Reed Herb.); #22. Museu Goeldi, in concrete fish tank. Oct. 21, 1961. F.D.Bennett. (Reed Herb. 40341); #20. Same loc. In artificial pond. Oct. 21, 1961. F.D.Bennett. (Reed Herb. 40346).

Obidos. #49. In lake Maraurú. Growing among Salvinia auriculata. Apr. 1963. Dupl. Aug. 24, 1963. F.D.Bennett. (Reed Herb.).

Manaus, Amazonas. #51. In small cross channel between Rio Negro and Rio Solimoes. Apr. 1963. Dupl. Aug. 24, 1963. F.D. Bennett. (Reed Herb.).

In South America the most frequent species of Azolla associated with Salvinia is Azolla filiculoides Lam. In Africa either Azolla nilotica Decaisne or Azolla pinnata var. africana (Desv.) Baker has been found associated with Salvinia auriculata and Pistia stratiotes.

## Azolla filiculoides Lam.

TRINIDAD: Watercress beds, 100 ft. elev. Watercress has been grown here since 1959; probably the Azolla was brought into the area with it. Aripo Valley Road. May 8, 1961. F.D.Bennett.

Herb. Trin. No. 16380. (Reed Herb. 39549; US); collected at West Indian Station, Imperial College of Tropical Agriculture. Sept. 21, 1961. (Reed Herb. 39550).

BRITISH GUIANA: In canals, Ogle Sugar Estate near Georgetown. Oct. 12, 1961. F.D.Bennett #11a. (Reed Herb. 39933); Old Water pond, Mon Repos Estate, Dept. of Agriculture. Oct. 16, 1961. F.D.Bennett #17a. (Reed Herb. 39936).

BRAZIL: In small channel between Rio Negro and Rio Solimoes, Manaus, Amazonas. May 1963. F.D.Bennett #52a. (Reed Herb.); in Lake Maraurú near Obidos, Amazonas. Apr. 1963. F.D.Bennett #48a. (Reed Herb.); in Lake Maraurú, near Obidos, Para. Apr. 1963. F.D.Bennett #49a. (Reed Herb.); pond near Inst. Agr. do Sul, Pelotas, R.G.S. Apr. 8, 1963. F.D.Bennett #31a. (Reed Herb.).

URUGUAY: In stagnant water, on granite, Pocitos, Dept. Montevideo. Apr./Jun. 1924. Guil. Herter 70518. (Reed Herb.); in stagnant water, Layago, Dept. Montevideo. Oct. 1924. Guil. Herter 79125. (Reed Herb.).

CHILE: Valparaiso, Laguna bei Vina del Mor. Jul. 1900. Dr. Otto Buchtien. (Reed Herb. 1082 - as A. magellanica).

ARGENTINA: Cordoba, prope urbem. Sept. 19, 1877. G. Hieronymus (Reed Herb. 33909 - as A. magellanica); in Wasserlachen am Rio Primero bei Cordoba. Sept. 10, 1877. G. Hieronymus. (Reed Herb. 33910 - as A. magellanica; Herb. U. Coimbra).

PERU: In pond near Calca. Apr. 20, 1915. O.F.Cook. & G.B. Gilbert 241. (U. Minn-433740; US).

## Azolla nilotica Decaisne

NYASALAND: Chiromo, Shine River. July 1957. W.S.Lacey. (GHSR-87005); Dist. Port Herald, Chiromo, floating on water at edge of Shine River, alt. 250 ft. Mar. 22, 1960. J.B.Phipps 2601. (GHSR); Dist. Lower Shine, Chiromo, junction of Shine and Riro Rivers, at ferry, alt. 150 ft. July 18, 1958. S.C.Seagrief 3163 (GHSR; Reed Herb. 54730).

MOZAMBIQUE: Dist. Gorongoza, on open pool among scrubby palm trees, alt. 300 ft. Sept. 26, 1953. N.C.Chase 5079. (GHSR-44120; Reed Herb. 54732); on mud banks, Uruna River and pools, Gorongosa Game Reserve. July 13, 1957. N.C.Chase 6616. (GHSR); on river bank on mud or floating on water, Zambezi River, alt. 900 ft. Dist. Buroma Prov. Aug. 7-8, 1950. N.C.Chase 2628.

(GHSR; Reed Herb. 54731); on surface of muddy pool, Urema Flats, Gorongosa Game Reserve. July 14, 1957. N.C. Chase 6619 and 6620. (GHSR).

UGANDA: Lake Kioga, Namasagali, shallow water in sheltered bays and gulleys where it forms a covering layer with Pistia stratiotes. Nov. 8, 1951. Mrs. E.M.Norman-S29. (Reed Herb. 33914).

Azolla pinnata var. africana (Desv.) Baker

CONGO: Stanleypool, alt. 900 ft. Sur les flaques d'eau embie les rochers. 1888. Fr. Hens No. 5. (Hb. Univ. Coimbra).

ZAMBIA: Edge of Bulosi Plain, below Mongu, Dist. Mongu. Nov. 9, 1959. R.B.Drummond & A.J.Cookson 6272. (GHSR); upstream end of Kandaker Island, near Victoria Falls, Dist. Livingstone. July 25, 1958. G.F.Cunningham van Someren. (GHSR-87308; Reed Herb. 54728).

MOZAMBIQUE: On lake Nhauvine, Gorongoza Game Reserve. Sept. 27, 1953. N.C.Chase 5080. (GHSR; Reed Herb. 54729).

SOUTH WEST AFRICA: Inseln des Ouavange. Aug. 3, 1958. H.Merxmuller 1970. (GHSR; Reed Herb. 54726).

BAROTSELAND: Bulozi Plain, Dist. Mongu. Jan. 10, 1960. W.Gilges 971. (GHSR; Reed Herb. 54727). Seems to be same locality as in Zambia.

GOLD COAST: On surface of mud in seasonal pond, alt. 10 m., 16 mi. on Ada Road. P.Cudjoe, Oct. 22, 1951. Collected for C.D. Adams 983. (Reed Herb. 33907).

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# MATERIALS TOWARD A MONOGRAPH OF THE GENUS LIPPIA. III

Harold N. Moldenke

LIPPIA CHEVALIERII Moldenke

Leaves subsessile; leaf-blades chartaceous, often rather thin, bright-green above, grayish-green beneath, oblanceolate, 4--6 cm. long, 1.3--2 cm. wide, acute at the apex, cuneate-attenuate at the base, sharply serrate except at and near the base, the teeth small and rather obtuse, antrorse, rather sparsely strigose above, much more densely so beneath; midrib very slender, usually plane above, prominulent beneath; secondaries very slender, 4 or 5 per side, ascending, almost indiscernible above, prominulous beneath; vein and veinlet reticulation indiscernible above, rather obscure beneath, flat; inflorescence axillary only, 3--6 per node at the uppermost 2 or 3 nodes, usually shorter than the subtending leaves; peduncles slender, 5--15 mm. long, densely white-pubescent with antrorse hairs; heads oblong, cylindric, 4--11 mm. long, 5--6 mm. wide, very densely yellow-tomentose, all save the lowest bractlets completely hidden by the yellow tomentum; lowest bractlets ovate, about 3 mm. long and 2 mm. wide, acuminate at the apex, densely tomentose on the back; corolla about 4 mm. long in all, its limb about 2 mm. wide.

The type of this species was collected by August J. B. Chevalier (no. 67) — in whose honor it was named — at Toukota, Soudan, Mali, on December 28, 1898, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. Vernacular names recorded for the plant are "bush tea" and "sichelinyamo". In Gambia beehives are smoked with this fragrant herb before being placed up in trees. It is claimed that the fragrance thus imparted to the hives attracts the bees to settle in the hives. Herbarium material has been misidentified and distributed in herbaria under the name L. adoensis Hochst.

In all, 11 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: MALI: Senegambia: Thierry 227 (K). Soudan: A. Chevalier 67 (Br--type, F--photo of type, N--isotype, N--photo of type, Si--photo of type, Z--photo of type). SENEGAL: Heudelot 103 (K), 107 (N). GAMBIA: Brown-Lester 4 (K, N), 28 (K); Dawe 30 (K); Ingram s.n. (K). REPUBLIC OF GUINEA: Caille 14772 (Br, K).

LIPPIA CHIAPASENSIS Loes., Verh. Bot. Ver. Brand. 53: 78. 1912.

Bibliography: Loes., Verh. Bot. Ver. Brand. 53: 78. 1912; Prain, Ind. Kew. Suppl. 5: 153. 1921; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20, & 95 (1942) and [ed. 2], 31, 35, & 189. 1949; Moldenke, Alph. List Cit. 3: 689, 919, & 962. 1949; M. C. Carlson, Bull. Torr. Bot. Club 81: 391 & 396. 1954; Moldenke, Résumé 37, 42, & 461. 1959.

Shrub, to 1.5 m. tall; branchlets at first tetragonal, finally terete, rather thick, densely hirtous, the older ones 3--4 mm. in diameter, finally calvescent; principal internodes 1.5--6 cm. long; leaves decussate-opposite, short-petiolate; petioles 4--7 mm. long, rather thick, densely hirtous; leaf-blades dark gray-olivaceous above, very slightly or scarcely lighter beneath, ovate, rigidly chartaceous, 3.5--5.5 cm. long, 1.5--3 cm. wide, acute at the apex, broadly cuneate to rounded at the base and narrowed into the petiole, subserrulate-crenate along the margins, densely strigillose-hirtous with bulbous-based hairs above and roughened, densely hirtous-pubescent beneath; midrib and secondaries conspicuous above, prominent or prominulous beneath; veinlet reticulation dense, impressed above, prominent beneath; inflorescence densely hirtous, the heads ternate or in 4's in the leaf-axils, subglobose, to about 1 cm. wide; peduncles 1.3--2 cm. long, densely hirtous; basal bractlets involucrate, rather thick, ovate-subdeltoid, rather obtusely subacuminate at the apex, sparsely hirtous on the inner and densely hirtous on the outer surface, about 5 mm. long and 3 mm. wide, densely ciliate, subparallel-veined, the remaining bractlets thinner, almost hyaline, much broader, subreniform-cordate, about 5 mm. long and to 6.5 mm. wide, more or less palmately venose, plainly reticulate near the margins, hirtous, ciliate; calyx during anthesis about 2 mm. long, but 3 mm. long in fruit, bifid, very hirsute, one apparently obtuse or rounded, the other bidentate at the apex; corolla yellow or pale-yellow, twice as long as the calyx, about equaling the subtending bractlets, sparsely puberulous at the apex, the tube subequal and narrow, the limb 4-lobed, the anterior lobe scarcely longer than the others; fruit similar to a pear seed, about 2.5 mm. long, 2-seeded, the cocci easily separating.

The type of this species was collected by Georg Edouard and Caecilia Seler (no. 2274) on a hill above Huiztan, in the central district of Chiapas, Mexico, in March, 1891, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph no. 17499, but is now destroyed.

The species has been found along highways, on slopes with Quercus, and on brushy hillsides, at an altitude of 1950 meters, flowering and fruiting in December and January. The labels accompanying Macbride's phototype are inscribed "Sellow 2274" and Loesener cites the type collection as "Seler 2274", but these are both palpable errors for Seler & Seler 2274. M. C. Carlson (1954) cites her no. 2246 from Guatemala as this species. Loesener (1912) says "Die Art scheint der L. bicolor Kunth et Bouché nahe zu stehen, die durch längere Köpfchenstiele, die weniger dicht und anderseits meist drüsig behaart sind, und durch grössere, lebhaft Involucralblätter von L. Chiapasensis abweicht."

In all, 5 herbarium specimens and 5 mounted phototypes have been examined by me.

Citations: MEXICO: Chiapas: Breedlove 7895 (Ac), 7929 (Ac); Langman 3734 (W--1976435); F. Ramirez s.n. [Dic. 3, 1951] (Z); Seler & Seler 2274 [Macbride photos 17499] (G--photo of type, Kr--photo of type, N--photo of type, N--photo of type, Ug--photo of type). GUATEMALA: Huehuetenango: P. C. Standley 81963 (N).

LIPPIA CHRYSANTHA Greenm., Proc. Am. Acad. Sci. 39: 87. 1903.

Bibliography: Greenm., Proc. Am. Acad. Sci. 39: 87. 1903; Prain, Ind. Kew. Suppl. 3: 104. 1908; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1244 & 1246. 1924; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 95. 1942; Moldenke, Alph. List Cit. 2: 466. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31 & 189. 1949; Moldenke, Alph. List Cit. 3: 683 & 830. 1949; Moldenke, Résumé 37 & 461. 1959.

Shrub, 1.5--2 m. tall; stems much-branched, covered with grayish bark; ultimate branchlets hirsute-pubescent; leaves decussate-opposite, short-petiolate; petioles 5 mm. or less in length; leaf-blades lanceolate to lanceolate-oblong, 2.5--8 cm. long, 1--3 cm. wide, acute or obtuse at the apex, finely and evenly crenate-dentate along the margins, cuneate or rounded at the base, rugose and hirsute-hispid above, soft-tomentose beneath, often showing a tendency to become reflexed; inflorescence in axillary, sessile, crowded spikes, much shorter than the subtending leaves, pubescent with spreading hairs intermixed with stipitate glands; floral bractlets lanceolate to somewhat oblanceolate, 6--7 mm. long, 2--2.5 mm. wide, acute at the apex; flowers solitary in the axils of the bractlets, short-pedicellate; calyx about 1 mm. long, bifid, pubescent with long pilose hairs, the divisions entire or minutely 2-dentate; corolla 5--6 mm. long, the tube slender, dark-yellow, externally pubescent, gradually ampliate above into the limb, which is yellow or greenish-yellow to white, 4-lobed; ovary and style glabrous.

The type of this rare species was collected by Cyrus Guernsey Pringle (no. 8679) on limestone hills, at an altitude of 1500 meters, near Yantepec, Morelos, Mexico, on October 26, 1902, and is deposited in the Gray Herbarium of Harvard University at Cambridge, Massachusetts. The species has been collected along ravines and

on limestone hills, in flower and fruit in October. Greenman (1903) says "A species well characterized by the sessile short inflorescences disposed in the axils of the upper leaves. L. Chrysantha is apparently nearly related to L. oaxacana Rob. & Greenm."

In all, 17 herbarium specimens, including type material, and 2 mounted photographs have been examined by me.

Citations: MEXICO: Morelos: Lundell & Lundell 12507 (N, Rf, Rf); Pringle 8679 (Ca--139662--isotype, Cm--isotype, G--type, It-isotype, Me--isotype, Me--isotype, Me--isotype, Mi--isotype, N--isotype, N--photo of isotype, Po--63773--isotype, S--isotype, S--isotype, Vt--isotype, Z--photo of isotype).

LIPPIA CIPOËNSIS Moldenke, Phytologia 6: 446. 1959.

Bibliography, Moldenke, Phytologia 6: 446. 1959; Moldenke, Résumé 425 & 461. 1959; Moldenke, Résumé Suppl. 1: 6. 1959; Hocking, Excerpt. Bot. A.5: 44. 1962.

Shrub, about 1 m. tall; stems and branches slender, gray, densely appressed whitish-strigose with antrorse hairs, twiggy; branchlets and twigs very slender, densely white-strigose with appressed hairs and densely foliose; principal internodes about 1 mm. long, uniform; nodes not annulate; leaves decussate-opposite, dense, sessile; leaf-blades thin-chartaceous, uniformly bright-green on both surfaces or slightly lighter beneath, elliptic, 5--6 mm. long, 2--3.5 mm. wide, abruptly acute at the apex and base, entire, densely short-pubescent on both surfaces, somewhat glistening; midrib filiform, mostly indiscernible above, very slightly prominulous beneath; secondaries and veinlets indiscernible on both surfaces; inflorescence capitate, axillary, clustered near the apex of the twigs but not strictly terminal; peduncles very slender, about 3 mm. long, very densely white-strigose with appressed antrorse hairs; heads about 7 mm. wide, densely many-flowered, densely white-villosulous; involucral bractlets lanceolate, about 2 mm. long, almost 1 mm. wide at the base, subacute at the apex, densely white-villosulous; calyx about 2 mm. long, densely white-villosulous, the teeth erect, subulate; corolla hypocrateriform, lilac, its tube about 3 mm. long, the limb about 2 mm. wide, white-villosulous on the outside; fruit not seen.

The type of this very distinctive species was collected by Henrique Lahmeyer de Mello Barreot and Alexandre Curt Brade (no. 14444) at km. 142, Serra do Cipó, Minas Gerais, Brazil, on April 16, 1935, and is deposited in the herbarium of the Botanisches Museum at Berlin. The plant has been collected in flower in April and June.

In all, 5 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Minas Gerais: Brade 13899 [Herb. Rio de Jan. 29525] (B, Z), 13900 [Herb. Rio de Jan. 29526] (B), 13901 [Herb. Rio de Jan. 29527] (B); Mello Barreto & Brade 14444 [Herb. Rio de Jan. 29521] (B--type).

LIPPIA CONTERMINA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1157. 1904.

Synonymy: Lippia turnerifolia var. camporum Griseb., Pl. Lorentz. 195. 1874.

Bibliography: Griseb., Pl. Lorentz. 195. 1874; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1157. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 493. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; T. Mey., Rev. Argent. Agron. 2: 356. 1936; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 20 & 95 (1942) and [ed. 2], 99, 104, & 189. 1949; Moldenke, Phytologia 3: 75 & 76 (1949) and 3: 290. 1950; Moldenke, Résumé 116, 125, & 461. 1959; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Troncoso, Darwiniana 12: 258, 269--271, & 275, fig. 6. 1961; Moldenke, Résumé Suppl. 7: 6 (1963) and 11: 7. 1964; Moldenke, Phytologia 12: 24 & 90. 1965.

Illustrations: Troncoso, Darwiniana 12: 270, fig. 6. 1961.

Annual or perennial herb, medium-sized, 0.2--1 m. tall, glutinous, dioecious; rhizome creeping; aerial stems simple or slightly branched, mostly 30--50 cm. tall, tetragonal, viscid- and glandular-pilosulous throughout; middle internodes 4--6 cm. long; leaves decussate-opposite, the lower ones reduced; petioles to 1 cm. long, viscidulous, glandular-pilosulous; lower leaf-blades ovate, middle ones ovate or ovate-elliptic, 5--7 cm. long, 2.5--4 cm. wide, the upper ones oblong-lanceolate or lanceolate, green on both surfaces, rather rigid, subacute at the apex, quite convex toward or below the middle, prolonged at the base into the petiole, roughened on both surfaces with small forward-pointing strigose hairs, strongly serrate along the margins with more or less undulate forward-pointing teeth 1--2 mm. long and 5--8 mm. apart; venation "3 pli-pennate", the lateral veins becoming somewhat reticulate and the lamina somewhat rugose; peduncles long, slender, 4--6 cm. long, about equaling the subtending leaves, spreading glandular-pilosulous throughout; heads about the size of a pea (Pisum sativum), axillary, cinereous; bractlets ovate-lanceolate, rather densely pubescent with forward-pointing hairs on the outer surface, the lowest barely surpassing the heads, the remainder about equaling the flowers; calyx minute, campanulate, about 0.5 mm. long, strigose-pubescent, obscurely subbilabiate, the lobes subentire; corolla yellow or orange, hypocrateriform, the tube subexserted, exceeding the calyx by scarcely 2 mm., puberulent above, 4-lobed, the lobes small, ovate, the posterior one larger, less than 0.5 mm. long; stamens and pistil normal for the genus, included.

This species was based on two collections made by Emil Hassler in Paraguay -- no. 912 from thickets at Fort López, in September, and no. 6941 from the campo near Valenzuela in the valley of the Río Y-acá, in January, 1900, both deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, of which Miss Troncoso has designated the latter as lectotype.

The species has been found on campos, riverbanks, and the edges of woods, at altitudes of 300 to 1000 meters, flowering from Sep-

tember to January and in April. Meyer refers to it as a very common plant and frequent in high campos in the Chaco. A vernacular name recorded for it is "salvia amarilla". The corollas are described as yellow on Meyer 134, Osten 91080, and Venturi 7559, but as orange on Schwarz 3575.

The Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 493 reference given in the bibliography above is sometimes cited as "Pl. Hassler. 2: 493. 1904" or as "Plantae Hasslerianae XI (1904) 493". Briquet says "Le L. contermina est assez voisin comme apparence du L. modesta Briq.; il en différe en première ligne par son indument glanduleux qui recouvre les pédoncules, les tiges et les petioles. Ce caratrère rapelle le L. asperrima, dont il s'ecarte par la forme des feuilles, les capitules deux fois plus petits, les bractées plus larges à indument non strigneux etc."

The name, Lippia turnerifolia var. camporum Griseb. was regarded by me in my 1959 publication as a synonym of Lantana brasiliensis Link. However, it is based on a specimen collected by Paul Günther Lorentz (no. 54) near Pozo del Alto, Tucumán, Argentina, on November 22, 1871. Miss Troncoso has examined an isotype and has verified its conspecificity with L. contermina. She says: "Especie basada en los ejemplares Hassler 912 y 6941. Estudiados detenidamente los cotipos de Ginebra, he elegido como lectotipo Hassler 6941, por tratarse de un ejemplar más completo, y coincidir en todo con la diagnosis de Briquet. Lippia contermina es una especie dioica, el lectotipo Hassler 6941 es un ejemplar ♀ y consiste en una rama joven en floración. El ejemplar Hassler 912 del Herbario de Ginebra, a primera vista bastante diferente del tipo, parece ser sin embargo, de una rama más robusta, sin las hojas basales, de un pie ♂ de la misma especie. Confirmaría esta opinión el hecho que los isocotipos de esta ejemplar que he podido consultar en los herbarios de Kew y British Museum, son típicamente L. contermina. Sin embargo, he preferido ilustrar la planta ♂ con un ejemplar argentino, Venturi 531, que coincide en un todo con el tipo. Las flores ♂ son de mayor tamaño que las ♀, el tubo corolar es infundibuliforme y poseen estambres y pistilo (son aparentemente hermafroditas), pero en ellas como en todas las especies dioicas citadas en esta nota, el pistilo no es funcional y las flores caen sin fructificar." She states that this species is very closely related to L. modesta Briq., differing in the pubescence: "L. modesta presenta pelos estrigosos en tallos, hojas, pedúnculos y brácteas, a veces pelitos glandulosos muy breves en el ápice de los pedúnculos y de las brácteas. L. contermina posee tallos, pedúnculos, brácteas, pecíolos y envés de las hojas densamente viscoso-glanduloso-pilosos." She cites the following 17 specimens not as yet seen by me: PARAGUAY: Hassler 912 (Cb--cotype, K--cotype), 2359 (Bm, P), 6941 (Bm--cotype, Cb--cotype, K--cotype). ARGENTINA: Chaco: T. Meyer 134 (Si); Rodrigo 2707 (Si). Corrientes: Sota 1035 (Ml).

Misiones: Schwindt 189 (Ml). Tucumán: Lorentz 54 (Cd); Venturi 531 (Si), 1375 (K, Si), 7359 (K, Si). She states that Hassler 6941 and Venturi 1375 & 7359 are pistillate; Hassler 912, Meyer 134, and Rodrigo 2707 are staminate; and Venturi 531 is a mixture of staminate and pistillate.

Hassler 2359 and Venturi 531, 1375, & 7359 have been formerly regarded by me as representing L. asperrima Cham. Other specimens cited by me as that species, and not now available to me for comparison because of having been returned to herbaria in various parts of the world, may also actually be L. contermina. More work needs to be done on the L. asperrima, L. contermina, L. modesta, L. morongii, L. turnerifolia, L. villafloridana group of species. The Vienna specimen of Hassler 2359 bears a label originally reading "Mimosa bimucronata var. hexandra f. viperes n. f.", but this is doubtless a case of mis-transcription.

In all, 15 herbarium specimens and 4 mounted photographs have been examined by me.

Citations: PARAGUAY: Hassler 2359 (Cb, V--1095); Osten 9179 (Ug), 9180 (F--photo, N, N--photo, S, Si--photo, Ug, Z--photo). ARGENTINA: Chaco: T. Meyer 134 [Herb. Osten 22669] (Ug), 255a [Herb. Osten 22948] (Ug). Misiones: G. J. Schwarz 3575 (N). Tucumán: Venturi 531 (W--1591224), 1375 [Herb. Inst. Miguel Lillo 32167; Herb. Osten 17237] (N, Ug, W--1591240), 7359 (Gg--161450).

LIPPIA CONTROVERSA Moldenke, Phytologia 1: 423--424. 1940.

Synonymy: Lippia pinetorum Moldenke, Phytologia 2: 20--21. 1941.

Bibliography: Moldenke, Phytologia 1: 423--424 (1940), 1: 504 (1941), and 2: 20--21. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20, & 96. 1942; Moldenke, Phytologia 2: 331. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Cit. 2: 536 (1948), 3: 714, 715, 818, 960, & 962 (1949), and 4: 999 & 1303. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35, 37, 39, 189, & 190. 1949; Moldenke, Phytologia 3: 73. 1949; Matuda, Am. Midl. Nat. 44: 576. 1950; Moldenke, Spec. Subsp. Cont. Mold. Set 45 p. [2]. 1951; Moldenke, Phytologia 4: 68. 1952; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Phytologia 5: 95. 1954; Moldenke, Résumé 37, 42, 44, 47, 316, & 461. 1959; Moldenke, Phytologia 12: 111. 1965.

Shrub, 1--2 m. tall; branchlets slender or rather slender, grayish or stramineous, obtusely tetragonal, obsoletely scattered-pilose or sparsely hirsute, becoming glabrescent in age; twigs nigrescent in drying, more abundantly pilose with scattered short spreading hairs; nodes flattened, annulate; principal internodes 2--9 cm. long; leaves decussate-opposite; petioles slender or rather stoutish, short, 5--10 mm. long, sparsely hirsute to sparsely or rather densely pilose-hirsutulous with stiff spreading hairs, more or less margined; leaf-blades chartaceous or

thick-chartaceous, uniformly gray-green on both surfaces or dark-green above and lighter beneath, often brunnescent in drying, ovate or ovate-elliptic to elliptic, 2--7.5 cm. long, 1.5--4.5 cm. wide, acute or short-acuminate to obtuse at the apex, acute or subacuminate to short-acuminate at the base, regularly serrate or serrulate from the apex to the base or almost to the base with blunt revolute-margined teeth, often rounded at the base and more or less attenuate into the petiole at the center, acute when immature, bullate and scabrous or very rough-scabrous above and rather abundantly or densely and harshly pilose or hirsutulous with bulbous-based whitish hairs, very sparsely and obscurely pilose or hirsute to almost subglabrous beneath; midrib slender, plane or impressed above, prominent beneath; secondaries slender, 4--8 per side, arcuate-ascending, mostly impressed above, sharply prominent beneath; veinlet reticulation abundant, mostly impressed or subimpressed above, plane or the larger portions prominulous beneath; inflorescence ample, axillary, simple, borne at the tips of the twigs, capitate, conspicuously involucrate, about equaling or shorter than the subtending leaves; peduncles very slender, 1 or 2 from each of the upper leaf-axils, 1--4 cm. long, densely hirsutulous to short-pubescent or puberulent with brownish gland-tipped hairs; heads 0.5--2.3 cm. wide; involucral bractlets very large and conspicuous, foliaceous, numerous, pale-green, ovate, the lowermost 8--10 mm. long and 5--6 mm. wide, acute at the apex, densely short-pubescent or puberulent with brownish gland-tipped hairs and scattered-hirsutulous with longer white hairs; corolla cream-colored, greenish-yellow, pale greenish-yellow, or bright-yellow, hypocrateriform.

The type of this species was collected by Paul Carpenter Standley (no. 58067) on a brushy slope near Las Lajas, at an altitude of about 1200 meters, Sacatepéquez, Guatemala, on November 28, 1938, and is deposited in the Britton Herbarium at the New York Botanical Garden. The type of L. pinetorum was collected by Eizi Matuda (no. 3925) in a pineland on Mount Ovando, Chiapas, Mexico, between November 14 and 18, 1939, and is deposited in the same herbarium.

The species has been found on brushy slopes, in pinelands and damp thickets, and in stony fields, at altitudes of 500 to 1300 meters, flowering and fruiting in November and December. Standley refers to the species as "common". Herbarium material has been misidentified and distributed in herbaria under the names L. callicarpaefolia H.B.K., L. cardiostegia Benth., L. substrigosa Turcz., L. umbellata Cav., and "cf. L. nutans Robinson & Greenm."

In all, 28 herbarium specimens, including the types of both names involved, and 2 mounted photographs have been examined by me.

Citations: MEXICO: Chiapas: Matuda 938 (Mh), 3925 (A, Mh, Mi, N, Rf). GUATEMALA: Escuintla: P. C. Standley 58223 (N). Jutiapa: P. C. Standley 77587 (N). Sacatepéquez: P. C. Standley 58067 (N--type). Santa Rosa: Heyde & Lux 4387 (C, G, N--photo, Z--photo); P. C. Standley 77777 (N). HONDURAS: Morazán: P. C. Standley 14183

(G, N). Tegucigalpa: Moldenke & Moldenke 19813 (Es, F, Fy, Lg, Mg, Mr, N, N, No, Rs, S, Sm, Ss). COSTA RICA: Puntarenas: H. Pittier 4429 (Br); Tonduz 4429 (Br).

LIPPIA CONTROVERSA var. BREVIPEDUNCULATA Moldenke, Phytologia 4: 56. 1952.

Bibliography: Moldenke, Phytologia 4: 56 & 68. 1952; Moldenke, Biol. Abstr. 26: 1471. 1952; Moldenke, Résumé 37 & 461. 1959.

This variety differs from the typical form of the species in having the peduncles under mature heads only 1 cm. long or less. It is a shrub about 1.5 m. tall, the flowers opening bright-yellow, fading to cream-color in age.

The type of the variety was collected by Edward Johnston Alexander (no. 192) on a riverbank at Nizanda, Oaxaca, Mexico, and is deposited in the Britton Herbarium at the New York Botanical Garden. The taxon is known thus far only from the original collection.

In all, 4 herbarium specimens, including the type, have been examined by me.

Citations: MEXICO: Oaxaca: E. J. Alexander 192 (N--type, N—isotype, W—isotype, Z--isotype).

LIPPIA CORIACEA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1160—1161. 1904.

Synonymy: Lippia coriacea f. angustifolia Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1161. 1904. Lippia coriacea f. latifolia Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1161. 1904. Lippia coreacea Briq. ex Moldenke, Résumé 311, in syn. 1959.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1160—1161. 1904; Briq. in Chod. & Hassler, Plant. Hassler. 2 (11): 496. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 95. 1942; Moldenke, Alph. List Invalid Names 30. 1942; Moldenke, Lilloa 8: 423—424. 1942; Moldenke, Alph. List Cit. 1: 39, 263, & 264 (1946) and 3: 692 & 693. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99 & 189. 1949; Moldenke, Résumé 116, 311, & 461. 1959; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Troncoso, Darwiniana 12: 258, 271, & 272, fig. 7. 1961; Moldenke, Phytologia 12: 24. 1965.

Illustrations: Troncoso, Darwiniana 12: 272, fig. 7. 1961.

Medium-sized shrub, 0.5--1 m. tall; branches erect, obtusely tetragonal, ferruginous-pubescent, the pubescence composed of a few antrorsely strigose hairs and short crisped spreading glanduliferous ones intermixed; middle internodes 2--5 cm. long; leaves abundant, decussate-opposite or often approximate, sessile or subsessile, ovate-elliptic or elliptic-lanceolate to lanceolate, 3—6.5 cm. long, 1--2.5 cm. wide, acute or short-acuminate at the apex, entire or superficially crenate-dentate toward the apex, revolute and somewhat convex along the margins, rounded-extenuate

at the base, thick-coriaceous, shiny above, paler green beneath, roughened with strigose hairs toward the apex on both surfaces, with abundant and short spreading, often glanduliferous, hairs beneath, 3- or 5-pli-nerved at the base; venation pinnate, the lateral veins macroscopic, reticulate, somewhat impressed above, prominulous beneath; inflorescence axillary, pedunculate; peduncles scarcely equaling the subtending leaves, slender, 3—5 cm. long, spreading glandular-pilosulous throughout; heads grayish, ovoid-subglobose, about 1 cm. long and wide; outer bractlets broadly ovate, acuminate at the apex, more or less nigrescent in drying, pilose toward the apex outside, otherwise densely short-pilose with glanduliferous hairs, the inner bractlets reduced and narrower, all about equaling the flowers in length; calyx minute, campanulate, scarcely more than 0.5 mm. long, pubescent throughout on the outer surface; corolla very small, yellow, surpassing the calyx by 2.5 mm., its tube cylindric, exserted, puberulent above on the outside, the lobes very small, about 0.5 mm. long, rounded at the apex, the anterior one larger; stamens and pistil normal for the genus, included; fruiting-calyx white-tomentose; schizocarp smooth, about 1.6 mm. long and 1.4 mm. wide, dehiscent, the inner surface of the cocci excavated.

This species was based by Briquet on two collections made by Emil Hassler in Paraguay -- no. 4473 from sandy places near the Río Capibary, September, and no. 6798 from a campo near Peribebuy in the valley of the upper course of the Río Y-acá, December, both deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where they were photographed together by Macbride as his type photograph no. 24650. The former of these two collections is also the type collection of Briquet's f. angustifolia and has been designated as lectotype of the species by Miss Troncoso. The second collection is the type of f. latifolia.

The species is placed by Miss Troncoso (1961) in her Subgenus Lippia, Section Lippia, and Series Axilliflorae. She says: "El fototipo del Museo de Chicago No. 24650 comprende les dos formas. He seleccionado como lectotipo Hassler 4473, cuyos detalles he dibujado. Especie dioica. Los dos ejemplares estudiados del Herbario de Ginebra son femeninos y se hallan en floración. No he visto frutos."

Briquet's original publication is sometimes cited as "Briq., Plantae Hasslerianae XI (1904) 496" or as "Briq., Plantae Hassler. 2: 496. 1904". Briquet (1904) says "Cette jolie espèce se place à côté du L. tristis, dont elle diffère par ses feuilles coriaces, dures, luisantes en dessus, à marges enroulées en dessous, et par l'indument."

The species is known to me only from 10 mounted photographs representing type material of all the names involved.

Citations: PARAGUAY: Hassler 4473 [Macbride photos 24650, in part] (It--photo of cotype, Kr--photo of cotype, N--photo of cotype, N--photo of cotype, W--photo of cotype), 6798 [Macbride photos 24650, in part] (It--photo of cotype, Kr--photo of cotype,

N--photo of cotype, N--photo of cotype, W--photo of cotype).

LIPPIA CORYMBOSA Cham., Linnaea 7: 219. 1832.
Synonymy: Lippia monticola Mart. ex Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 99, in syn. 1877.

Bibliography: Cham., Linnaea 7: 219. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 597. 1843; Walp., Repert. Bot. Syst. 4: 45--46. 1845; Schau. in A. DC., Prodr. 11: 590. 1847; Schau. in Mart., Fl. Bras. 9: 245. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 99. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Invalid Names 14. 1947; Moldenke, Alph. List Cit. 2: 484 (1948), 3: 691, 710, & 915 (1949), and 4: 1014, 1203, & 1204. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; Moldenke, Résumé 93, 314, & 461. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 12: 24. 1965.

Shrub, about 0.5 m. tall, corymbosely branched, densely leafy, hirtous throughout; stems or branches about 30 cm. long, leafless below, simple, corymbosely twiggy above; leaves ternate, rather rigid, very short-petiolate; leaf-blades ovate, acute at the apex, very much bullate-rugose, rather shiny and strigose-hirtellous above, pubescent and often glandulose beneath and hirsute on the venation, revolute and crenate along the margins, the central ones on the stems about 1.6 cm. long and 1 cm. wide, the upper ones gradually smaller; inflorescence corymbose-paniculate, canescent with whitish hairs; heads ovoid, short-pedunculate, solitary in the leaf-axils, equaling or surpassing the subtending leaves, congested at the tips of the branchlets, about 1.3 cm. long during anthesis, lax, finally much elongated and subracemose or spike-like; bractlets membranous, somewhat colored, lanceolate, 3-nerved, loosely imbricate, about 6 mm. long, almost equaling the corolla-tube, acute or obtuse at the apex; calyx very short, incanous-hirsute; corolla reddish or rose, almost 8 mm. long, villosulous on the outside, the tube ventricose on the outside, the limb rather large, very lightly velutinous on the outer surface, unequally 4-fid, the dorsal lobe retuse, the lateral lobes truncate.

The type of this species was collected by Friedrich Sellow in the Serra da Moeda, Minas Gerais, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, but is now destroyed, although Chamisso says simply "E Brasilia misit Sellowius noster." The type of L. monticola was collected by Carl Friedrich Philipp von Martius (no. 1035) at or near Itabira do Campo in the same state, in March, 1839, deposited in the Martius Herbarium at Munich, where it was photographed by Macbride as his type photograph no. 20323. The species is classified by Schauer in his Section Zapania, Subsection Corymbosae. It has been collected in anthesis from November to January and in March. Schauer (1851) cites also P. Clausen s.n. and Lund s.n. from Itabira do Campo, and Riedel s.n. from sandy wet places in the Serra da Lapa.

Material of L. corymbosa has been misidentified and distributed in herbaria under the name L. pseudo-thea Leut. Glaziou (1911) cites also his nos. 17713, 19713, and 19714 from Habira do Campo and Pinheiro, near Diamantina, Minas Gerais, and describes the plant as "Frutescent, fls. roses, jan.--mars." He records the vernacular name "chá de pedestre".

In all, 14 herbarium specimens and 4 mounted photographs, including type material of one of the names involved, have been examined by me.

Citations: BRAZIL: Goías: Glaziou 21895 (Br, N); Macedo 3492 (N, S, S, W--2197143). Minas Gerais: Black, Magalhães, & Graflinger 51-12217 (Be--70044); P. Clausen 64 (Br); Martius 1035 [Macbride photos 20323] (Br, It--photo, Kr--photo, N--photo, W--photo); Mello Barreto 10703 [Herb. Jard. Bot. Bello Horiz. 31800] (N); Murça Pires & Black 3348 (Be--63792); Regnell s.n. [Herb. Mus. Nac. Rio Jan. 14857] (W--1199338); Schwacke s.n. (Ja--14888); Ule 2669 (Ja--14882).

LIPPIA COSTARICENSIS Moldenke, Phytologia 1: 424--425. 1940.

Bibliography: Moldenke, Phytologia 1: 424--425 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23 & 95. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Cit. 3: 940 (1949) and 4: 999. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39 & 189. 1949; Brizicky, Stern, & Chambers, Trop. Woods 109: 78. 1958; Moldenke, Résumé 47, 48, & 461. 1959.

Tree, to 18 m. tall; trunk to 33 cm. in diameter; branchlets stoutish or rather slender, acutely tetragonal, often submargined, more or less substrigose-pilose; nodes plainly annulate, often conspicuously so; principal internodes 2--4.5 cm. long; leaves decussate-opposite, with a mint-like aroma; petioles slender, 1—2 cm. long, usually short, more or less appressed-strigose; leaf-blades chartaceous, rather uniformly green on both surfaces, narrowly elliptic, 8—18 cm. long, 1.5—5 cm. wide, rugose, attenuate and acute or acuminate at the apex and base, regularly serrulate from the apex to the base with very fine rounded and appressed teeth, often subrevolute along the margins, slightly scabrous and minutely strigillose above, glabrescent and merely punctate in age, minutely puberulent beneath, often only on the venation; midrib rather stout, plane above, prominent beneath; secondaries slender, 8—10 per side, plane above, prominent beneath; veinlet reticulation abundant, plane (often obscure) above, the larger portions subprominulous beneath; inflorescence axillary, paniculate, with 1—3 whorls of capitate branches subtended by more or less foliaceous bracts; heads 5—10 mm. wide, conspicuously bracteolate; bractlets large, ovate, stramineous, the lowermost about 6 mm. long and 4 mm. wide, minutely puberulent; corolla yellow.

The type of this species was collected by Alexander Frank Skutch (no. 2292) at an altitude of 915 meters in the vicinity of El General, San José, Costa Rica, in December, 1935, and is depos-

ited in the Britton Herbarium at the New York Botanical Garden.

The species has been found in forests, clearings, and on volcano slopes, at altitudes of 915 to 2000 meters, flowering in June, August, and December, fruiting in December. A vernacular name recorded for the plant is "caragra". Material has been misidentified and distributed in herbaria under the names L. myriocephala Schl. and "Lippia (near umbellata Cav.)".

In all, 11 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: COSTA RICA: Alajuela: Skutch 3297 (A, N, S). Cartago: J. A. Echeverria 6 (Ca—776208). San José: E. W. D. Holway 307 (W—862556); Skutch 2292 (F—photo of isotype, G—isotype, N—type, N—photo of isotype, S—isotype, Si—photo of isotype, Z—photo of isotype); Tonduz 1262 (Br). PANAMA: Chiriquí: Stern & Chambers 88 (A, Z).

LIPPIA CURTISIANA Moldenke, Phytologia 1: 425—426. 1940.

Bibliography: Moldenke, Phytologia 1: 425—426 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20, & 95. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 55. 1948; Moldenke, Alph. List Cit. 2: 467 (1948) and 3: 775, 786, 962, & 973. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35, & 189. 1949; Moldenke, Résumé 37, 42, & 461. 1959.

Shrub, 1—2 m. tall, with the odor of Lantana; branches and branchlets slender, gray, obtusely tetragonal, densely short-pubescent with sordid appressed hairs, glabrescent in age; nodes not annulate; principal internodes 0.5—3 cm. long; leaves decussate-opposite or ternate; petioles slender, 4—7 mm. long, densely short-pubescent with appressed sordid hairs; leaf-blades chartaceous or thickish-chartaceous, often falcate and conduplicate in drying, rather uniformly grayish-green on both surfaces or dull-green above and slightly lighter or gray-green beneath, ovate, 1.5—5.5 cm. long, 0.8—3.4 cm. wide, acute at the apex, regularly serrulate with small, blunt appressed or spreading teeth from almost the base to the apex and usually slightly revolute, abruptly acute or rounded at the base, strigose and scabrous-bullate above, short-pubescent beneath (especially along the venation); midrib very slender, subimpressed above, prominulous beneath; secondaries very slender, 4—8 per side, ascending, not much arcuate, impressed above, prominulous beneath; vein and veinlet reticulation abundant, more or less impressed above and often subprominulous beneath; inflorescence axillary, capitate, simple, abbreviated; peduncles very slender, usually 3 per axil, 0.7—2 cm. long, densely appressed-pubescent with sordid-gray hairs; heads to 9 mm. wide during anthesis, to 13 mm. wide in fruit; bractlets ovate, the lowermost to 4 mm. long and 3 mm. wide, densely appressed-puberulent, in fruit greatly expanded and reniform, venose, to 9 mm. wide, stramineous.

The type of this species was collected by Edward Palmer (no. 479) at the city of Durango and its vicinity, at an altitude of

6207 feet, Durango, Mexico, between April and November, 1896, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is named in honor and grateful appreciation of Dr. Carleton Clarence Curtis (1862--1945), for many years professor of botany at Columbia University, author of valuable texts, inspirational teacher, and valued friend and advisor of scores of the present generation of American botanists, who will always honor and revere his memory.

The species is known from the margins of spring-fed swamps, in wet meadows along streams, in pine-oak forests, pine forests, and open limestone hillsides at altitudes of 1500 to 3000 meters, fruiting in January, February, April, and October. A vernacular name recorded for it is "hierba de la mula". The plant is said to be used as a condiment at meals in Durango. Material has been misidentified and distributed in herbaria as L. umbellata Cav. Steyermark 36533 is placed here tentatively.

In all, 12 herbarium specimens, including the type, have been examined by me.

Citations: MEXICO: Durango: Ochoterena s.n. [Octobre 1910] (Me); Edw. Palmer 479 [April to Nov. 1896] (Ca--104944--isotype, G--isotype, G--isotype, G--isotype, Me--isotype, N--type, Po--64105--isotype). GUATEMALA: Baja Verapaz: P. C. Standley 91197 (N). Huehuetenango: P. C. Standley 82044 (N). San Marcos: Steyermark 36533 (F--1039554). Totonicapán: P. C. Standley 84076 (N).

LIPPIA DAUENSIS (Chiov.) Chiov., Fl. Somala 2: 359. 1932.

Synonymy: Lantana dauensis Chiov., Ann. Bot. Roma 10: 402. 1912. Lippia ellenbeckii Loes. ex Moldenke, Résumé Suppl. 1: 19, in syn. 1959. Lippia ellenbeckii var. pinnatifida Loes. ex Moldenke, Résumé Suppl. 1: 19, in syn. 1959.

Bibliography: Chiov., Ann. Bot. Roma 10: 402. 1912; Prain, Ind. Kew. Suppl. 5: 147. 1921; Chiov., Fl. Somala 2: 359. 1932; A. W. Hill, Ind. Kew. Suppl. 9: 161. 1938; Moldenke, Alph. List Invalid Names 28. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 46 & 95 (1942) and [ed. 2], 110 & 189. 1949; Moldenke, Résumé 135, 146, 304, & 461. 1959; Moldenke, Résumé Suppl. 1: 8 & 19. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 791. 1962.

Very aromatic shrub; main branches virgate, elongate, obtusely tetragonal, glabrous, with the bark pale, smooth, and longitudinally striatulate when dry; branchlets 6-angulate, the angles bearing numerous, minute, rigid bristles which are bulbous-based and abruptly bent upwards; leaves decussate-opposite or ternate; petioles short, 2--4 mm. long; leaf-blades lanceolate, 4--5 cm. long and (not including the teeth) 6--10 mm. wide, rather broadly acute or obtuse at the apex and mucronulate, gradually attenuate into the petiole at the base, nigrescent in drying, glabrous and smooth above, glabrous beneath, but with sparse and short, rigid, antrorsely recurved, bulbous-based bristles on the venation and margins, deeply dentate-lobulate along the margins with 6--8 triangular-

linear teeth which are acute and divaricate, the median ones to 6 mm. long; midrib and secondaries impressed above, prominulous beneath; inflorescence solitary, at first globose and 4--5 mm. wide, eventually cylindric-elliptic, 10 mm. long, and 4.5--5 mm. wide; peduncles slender, 2 or 3 per node, 3--6 cm. long, tetragonal, glabrous; bractlets ovate-triangular, 1.5--2 mm. long, obtuse or subapiculate at the apex, densely pubescent; calyx globose, bilobed, densely short-pilose on both surfaces with flexuous white hairs interspersed with sessile yellow glands, about 1.5 mm. long and wide during anthesis, not venose, very closely appressed to the fruit, the lobes very small, rounded, very deeply split above; corolla hypocrateriform, white even when dry, about 1.5 mm. long, minutely furfuraceous on the outside, the lobes short, rather broadly rounded; fruit globose, about 2.5 mm. long, separating into 2 nutlets which are rounded on the commissural face, concave, white-calcareous, minutely rugulose on the outside, green, glabrous, visible only at the apex and along the split in the calyx, the remainder hidden by the mature calyx; exocarp spongy in drying, pitted under a handlens, thick, very distinct from the subligneous endocarp; cells 2; seeds without endosperm.

The type of this species was collected by Domenico Riva and Ruspoli (no. 1613 [1054]) in "Ogaden: sulla sponde del Daua a Veldà", Ethiopia, on April 21, 1893. Chiovenda placed the species in Section Sarcolippia of Lantana and says "Specie rilevante per il pericarpio assai spesso, spugnoso, per il quale si differenzia dalla specie di Lippia che presentano invece il pericarpio sottile poco sensibile. Le foglie per la loro dentatura ricordano quelle del Lycopus europaeus."

Cufodontis (1962) comments: "locum typi cl. auctor errore in Ogaden putavit." Prain (1921) places the type locality in "Somaliland". Lippia ellenbeckii var. pinnatifida is based on Ruspoli & Riva 1459 from Ethiopia, deposited in the herbarium of the Botanisches Museum at Berlin. This specimen also has the numbers "1054" and "1613" on its labels, apparently indicating its conspecificity with the type of L. dauensis. Cufodontis gives "1045" as a supplementary number for the type.

Lippia dauensis has been found growing on lava plains, at an altitude of 3200 feet. A vernacular name recorded for it is "rehan". The plant is said to be of value for an essential oil. Material has been distributed in herbaria as "Lippia cf. L. carviodora Meikle".

In all, 5 herbarium specimens, including type material of one of the names involved, have been examined by me.

Citations: ETHIOPIA: Ruspoli & Riva 1459 (B, Z). KENYA: J. B. Gillet 13928 (B, S, Z).

LIPPIA DIAMANTINENSIS Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911.

Bibliography: Glaz,, Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Prain, Ind. Kew. Suppl. 5: 153. 1921; Moldenke, Known Geogr.

Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 238 (1946) and 3: 731. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; Moldenke, Résumé 93 & 461. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960.

Erect bush, about 1 m. tall; stems and branches slender, more or less tetragonal or angular, dark, short-pubescent on the younger parts with brownish antrorsely curvate simple hairs, glabrescent in age; nodes not annulate; principal internodes 1--3 cm. long; leaves decussate-opposite or ternate, abundant, rather close together, petiolate; petioles slender, 1--3 mm. long, sparsely strigillose; leaf-blades coriaceous, firm and rigid, shiny and bright-green above, dull-green beneath, ovate-subrotund, 1--2 cm. long, 0.5--2 cm. wide, rounded at the apex, regularly dentate from the widest point to the apex with conspicuous spreading revolute-margined or appressed and inconspicuous rounded teeth, rounded at the base or very slightly prolonged into the petiole, very scabrous above with persistent bulbous bases of scattered very short antrorse rigid strigose hairs, the roughness felt only when the finger is drawn from the apex toward the base, densely short-pubescent and resinous-glandulose beneath; midrib very slender, deeply impressed above, prominent beneath; secondaries slender, 4 or 5 per side, ascending and rather straight, conspicuous, impressed above, prominent beneath; veinlet reticulation mostly indiscernible above, the tertiaries prominulous beneath; inflorescence axillary, in the upper leaf-axils only, 2 per node, greatly surpassing the leaves, showy; peduncles solitary, slender, 1--2.5 cm. long, densely short-pubescent with spreading hairs; heads subglobose, 1.5--2.5 cm. long and wide, densely many-flowered; bractlets membranous, very large and conspicuous, reddish or old-rose, ovate, showy, about 10 mm. long and 8 mm. wide, rounded and obscurely mucronulate at the apex, reticulate-venose, rather sparsely short-pubescent on both surfaces; corolla hypocrateriform, lavender or bright-pink, its tube slender, about 8 mm. long, spreading-pubescent on the outside, ampliate at the apex, the limb about 7 mm. wide, venose, very sparsely pilosulous or glabrescent beneath, glabrous above; stamens and pistil included.

The type of this rare species was collected by Auguste François Marie Glaziou (no. 19712) on a campo at Curalinho, near Diamantina, Minas Gerais, Brazil, in 1892. The original publication merely states "n. sp.? in herb. Paris., Berol., Kew., Brux., etc. -- Curalinho, près Diamantina, dans le campo, MINAS, no. 19712. Frutescent, fl. roses. Mars-avril. R." The species is said to occur occasionally and scattered in open gravelly pastures and on sandstone slopes and summits, from 900 to 1170 meters altitude, flowering in May, June, and August. Material has been misidentified and distributed in herbaria as L. gardneriana Schau. On the other hand, the Markgraf, Brade, Mello Barreto & Mendes Magalhães 3273, distributed as L. diamantinensis, is actually L. hederaefolia Mart. & Schau.

In all, 8 herbarium specimens, including the type collection, have been examined by me.

Citations: BRAZIL: Minas Gerais: Brade 13458 [Herb. Rio de Jan. 29529] (B); Glaziou 19712 (N--isotype); A. Lutz 1096 (Z); Maguire, Mendes Magalhães, & Maguire 49255 (N); Mexia 5888 (Gg--286543, Go, N, S).

LIPPIA DOMINGENSIS Moldenke, Phytologia 2: 314--315. 1947.

Bibliography: Moldenke, Phytologia 2: 314--315. 1947; Moldenke, Alph. List Cit. 2: 569. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 48 & 189. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 57 & 461. 1959.

Prostrate or spreading shrub; stems to 1.2 m. long, slender, gray, often rooting at the nodes, glabrous, the bark exfoliating in age; branches numerous, short, very slender, tetragonal, densely brownish-puberulent, resinous, glabrescent in age; branchlets and twigs numerous, very slender, tetragonal, densely brownish-puberulent, resinous; nodes annulate; principal internodes abbreviated, 3--20 mm. long; leaves decussate-opposite or ternate, numerous, very small; petioles very slender, 1--2.5 mm. long, strigillose-puberulent, resinous; leaf-blades very small, rather thick-textured, bright-green above, somewhat lighter beneath, oval or suborbicular, 4--15 mm. long, 3--11 mm. wide, rounded at the apex, acute at the base, deeply bullate above, regularly dentate with small rounded rather spreading teeth along the margins, rugose and very scabrous above, appressed-pubescent or strigose beneath and somewhat resinous; midrib slender, deeply impressed above, very prominent beneath; secondaries very slender, 3--6 per side, ascending, rather straight, deeply impressed above, very prominent beneath; tertiaries very slender, connecting the secondaries and at right angles to them, rather straight and subparallel, deeply impressed above, prominulent beneath; inflorescence axillary, sparse, less than 1 cm. long in all, about equaling the subtending leaves; peduncles very slender, 4--5 mm. long, densely puberulent and resinous; heads few-flowered, subglobose, not elongating in fruit, only 4 flowers opening at a time; bractlets elliptic or oblanceolate, 2.5--3 mm. long, 1 mm. wide, obtuse or subacute at the apex, resinous-puberulent; corolla white, its tube 3--4 mm. long, slightly surpassing the subtending bractlets, the limb 1--1.5 mm. wide.

The type of this species was collected by Richard Alden Howard and E. S. Howard (no. 8110) at the edge of a limestone ravine in pinewoods along the trail between Pedernales and Aceitial, at an altitude of 4200 feet, in the province of Barahona, Dominican Republic, between August 8 and 12, 1946, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is thus far known only from the type locality.

In all, 4 herbarium specimens, including the type, have been examined by me.

Citations: HISPANIOLA: Dominican Republic: Howard & Howard 8110 (N--type), 8125 (N), 8192 (N, S).

LIPPIA DRACOCEPHALOIDES Turcz., Bull. Soc. Nat. Mosc. 36 (2): 205.

1863.

Bibliography: Turcz., Bull. Soc. Nat. Mosc. 36 (2): 205. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 223 (1946) and 3: 692. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Résumé Suppl. 8: 2. 1964.

Shrubby; stems rather acutely tetragonal, pubescent-hirtous; leaves decussate-opposite or ternate; petioles very short; leaf-blades linear-lanceolate, acuminate at the apex, attenuate at the base, serrate along the margins except at the base, pubescent on both surfaces; inflorescence axillary, capitate, the heads (especially the lower ones) long-pedunculate, nodding; bractlets ovate, shortly acute at the apex, fuscescent.

The type of this distinctive species was collected by George Gardner (no. 4334) in Goías, Brazil, between 1836 and 1841; an isotype in the Delessert Herbarium at the Jardin Botanique in Geneva was photographed by Macbride as his type photograph no. 24648.

In all, 3 herbarium specimens, including material of the type collection, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Brasilia: Murça Pires, Silva, & Souza 9652 (Z). Goías: G. Gardner 4334 [Macbride photos 24648] (It--photo of isotype, Kr--photo of isotype, N--isotype, N--photo of isotype, W--photo of isotype).

LIPPIA DUARTEI Moldenke, Phytologia 10: 170--171. 1964.

Bibliography: Moldenke, Phytologia 10: 170--171. 1964.

Apparently a perennial plant with rather strict stems or branches, densely cinereous-pubescent throughout; stems or branches slender, obtusely tetragonal, densely cinereous-pubescent with short appressed antrorse hairs; nodes not annulate; principal internodes conspicuously elongated, 3.5--9 cm. long; leaves decussate-opposite, the lower ones often with abbreviated leafy non-floriferous twigs in their axils; petioles slender, conspicuously elongated on upper mature leaves and there about 1.5 cm. long, very densely cinereous-pubescent, canaliculate above, the hairs straight and antrorse; leaf-blades chartaceous, dark-green above, lighter beneath, oblong, to 7 cm. long when mature and 2 cm. wide, apparently only a few mature ones present during anthesis, attenuate-acute at the apex, rounded at the base, uniformly crenate along the margins, deeply rugose and scabridous-pubescent above, more densely cinereous-pubescent (especially on the larger venation) beneath; midrib and the numerous secondaries slender, deeply impressed above, prominent beneath; veinlet reticulation abundant, deeply impressed above on mature leaves; inflorescence axillary, much shorter than the subtending mature leaves, solitary or binary in each of the upper leaf-axils, 2--3 cm. long, very densely white-pubescent with straight antrorse subappressed hairs; heads hemispheric, many-flowered, 5--10 mm. wide; bractlets ovate, the outer ones about 2 mm. long and 1 mm. wide, acute at the apex, appressed-puberulent.

The type of this curious species was collected by Apparicio Pereira Duarte (no. 7851) -- in whose honor it was named -- at Varzea da Palma, Faz. Mãe d'Agua, Minas Gerais, Brazil, on April 28, 1963, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is known to me thus far only from the type specimen.

Citations: BRAZIL: Minas Gerais: Duarte 7851 [Herb. Bradeanum 27896] (N--type).

LIPPIA DUMETORUM Herzog, Meded. Rijksherb. Leiden 29: 45. 1916.

Bibliography: Herzog, Meded. Rijksherb. Leiden 29: 45. 1916; A. W. Hill, Ind. Kew. Suppl. 6: 117. 1926; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 40 & 95. 1942; Moldenke, Lilloa 8: 424 (1942) and 10: 378. 1944; Moldenke, Alph. List Cit. 2: 535 (1948) and 3: 692. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97 & 189. 1949; Troncoso, Darwiniana 10: 72. 1952; Moldenke, Résumé 114 & 461. 1959; Moldenke, Résumé Suppl. 11: 5. 1964.

Branched shrub, 3--4 m. tall; young branches obtusely angular, dark, sulcate, loosely tomentellous; leaves decussate-opposite; petioles medium in texture, 8--14 mm. long; leaf-blades chartaceous, ovate-oblong, 6--7 cm. long when mature, 2.5--2.8 cm. wide, subacute at the apex, crenate along the margins, subobtuse and contracted at the base, reticulate and glandulose on both surfaces, softly gray-pubescent beneath; inflorescence spicate, densely fasciculate in the leaf-axils, short-pedunculate, erect, usually at the apex of the branches, with a paniculate aspect; peduncles 4--5 mm. long; spikes narrowly oblong, 4-farious, about 1.5 cm. long (including the peduncle); bractlets imbricate, broadly ovate-triangular, acute at the apex, concave, 3--4 mm. long and 3 mm. wide, equaling the corolla-tube, short-villous; calyx somewhat compressed, narrow, puberulent; corolla-tube about 3 mm. long, somewhat dilated at the middle, minutely puberulent above; corolla-limb 2-lipped, crisped.

The type of this poorly understood species was collected by Theodor K. J. Herzog (no. 1851) at an altitude of 1600 meters at Quebrada de Chajravuaitu, Bolivia, in April, 1911; an isotype in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva was photographed by Macbride as his type photograph no. 24649. The original publication is cited at the Instituto Miguel Lillo as "Herzog, Bolivia III (1916) 45". The species is known thus far only from the type collection. For a comparison of this species with L. hickenii Troncoso, see the latter species in these notes.

In all, 2 herbarium specimens and 4 mounted photographs of the type collection have been examined by me.

Citations: BOLIVIA: Province undetermined: T. K. J. Herzog 1851 [Macbride photos 24649] (It--photo of isotype, Kr--photo of isotype, N--isotype, N--photo of isotype, S--isotype, W--photo of isotype).

LIPPIA DURANGENSIS Moldenke, Phytologia 1: 426. 1940.

Synonymy: Lippia pennellii Moldenke, Alph. List Cit. 3: 786, hyponym. 1947. Lippia durangense Moldenke, Résumé Suppl. 6: 10, in syn. 1963.

Bibliography: Moldenke, Phytologia 1: 426--427 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 95. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Cit. 3: 786 & 807 (1949) and 4: 1071. 1949; Moldenke, Phytologia 3: 132. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31 & 189. 1949; Moldenke, Résumé 37 & 461. 1959; Moldenke, Résumé Suppl. 6: 4 & 10 (1963) and 8: 5. 1964.

Small bushy shrub, 1--4 m. tall, slender; branchlets slender, obtusely tetragonal, brownish, densely appressed-pubescent; nodes annulate; principal internodes 3--7 cm. long; leaves decussate-opposite, ternate, or whorled in 4's; petioles very slender, 5--7 mm. long, densely puberulent and resinous-glandular, less so in age; leaf-blades thin-chartaceous, dark-green above, much lighter beneath, elliptic, often falcate and more or less conduplicate in pressing, 4--6 cm. long, 1.3--3 cm. wide, acute at the apex, regularly serrate from almost the base to the apex with rather small rounded and often appressed teeth, acute or acuminate at the base, very rough-scabrous above, rather densely puberulent and resinous-punctate beneath; midrib slender, plane or subimpressed above, prominulous beneath; secondaries very slender, 5--8 per side, arcuate-ascending, subimpressed above, prominulous beneath; veinlet reticulation abundant, subimpressed above, the larger portions prominulous beneath; inflorescence axillary, capitate, simple, crowded; peduncles very slender, 1--3.5 cm. long, 2--5 or more in each leaf-axil, more or less densely short-pubescent with substrigose whitish hairs, often also resinous-punctate; heads 6--9 mm. in diameter; bractlets large and conspicuous, ovate, very plainly venose with a conspicuous reticulum, the lowest about 5 mm. long and wide, acute at the apex, puberulent-margined; corolla pale-yellow or greenish-yellow.

The type of this species was collected by Francis Whittier Pennell (no. 18189) on a rocky andesitic slope, at an altitude of 1900 to 2000 meters, at Chupaderos, north of Durango, in the Sierra Madre Occidental, Durango, Mexico, on August 24, 1934, and is deposited in the United States National Herbarium at Washington. The beautifully venose bractlets are quite characteristic. The type of L. pennellii was collected by Edward Palmer (no. 496) at Tejamén, Durango, Mexico, between August 21 and 27, 1906.

Lippia durangensis has been found in oak woodlands and grama grasslands, on a volcanic rim in grama grassland, and in volcanically derived reddish sandy clay in grama grassland among rocks, at altitudes of 1900 to 2500 meters, flowering from August to October, fruiting in March and August to October. Waterfall found it on a stony hillside with grass, cactus, and acacias.

Material has been misidentified and distributed in herbaria as Lantana velutina Mart. & Gal. On the other hand, the H. S. Gentry 7222, distributed as Lippia durangensis, is actually L. umbellata

Cav.

In all, 15 herbarium specimens, including the types of all the names involved, have been examined by me.

Citations: MEXICO: Chihuahua: Correll & Gentry 22751 (Ld); Gentry & Arguelles 17919 (Ld, Ld), 18064 (Ld). Durango: H. S. Gentry 6907 (Ak—22873, G, Mi, N); E. W. Nelson 4725 (W—332779); Edw. Palmer 496 (Ca—139735, N); F. W. Pennell 18189 (W—1640972—type); Waterfall 15534 (St). Zacatecas: H. S. Gentry 8516 (G, N).

LIPPIA EKMANI Moldenke, Phytologia 2: 365—366. 1947.

Bibliography: Moldenke, Phytologia 2: 365—366 & 386. 1947; Moldenke, Lilloa 14: 42. 1948; Moldenke, Alph. List Cit. 4: 1256. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed.2], 104 & 189. 1949; Moldenke, Phytologia 3: 376 & 377. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 93, 125, & 461. 1959.

Perennial herb or shrub, 0.8—5 m. tall; stems apparently simple and erect, subtetragonal, stramineous, very sparsely and obscurely asperulous above, becoming smooth in age; principal internodes elongated, 7—8.5 cm. long; leaves ternate; petioles inconspicuous or obsolete, to 2 mm. long, subglabrous or with a few scattered hairs; leaf-blades chartaceous, uniformly bright-green on both surfaces, elliptic, 2.3—4.5 cm. long, 1.3—2.3 cm. wide, acute or submucronate at the apex, subentire or with a few very much appressed teeth above the middle, rounded or subacute at the base, densely resinous-punctate on both surfaces, asperous above, smooth and glabrous (or with a few scattered microscopic hairs) beneath; midrib plane or subimpressed above, prominulous beneath; secondaries very slender, arcuate-ascending, 3 or 4 per side, terminating in the sinuses between the marginal teeth; inflorescence terminal, racemiform, 15—20 cm. long, the 4—6 straight erect sympodia 2—4 cm. long, tetragonal, rather densely resinous-glandular and puberulent; peduncles similar to the stems, 4—6 cm. long, tetragonal, asperous-puberulent and resinous-glandular; heads numerous, the uppermost in pairs on the rachis, the lower in whorls of 3—5, the upper sessile or on slender pilosulous and resinous stalks 2—6 mm. long, the lower on stalks to 2 cm. long; the individual heads hemispheric, 1—1.5 cm. wide, eventually to 1 cm. long, many-flowered; bracts 3 at each node of the rachis, narrowly elliptic, to 1 cm. long and 4 mm. wide, attenuate-subacuminate at the apex, attenuate-acute at the base, sessile, asperulous-puberulent and resinous-glandulose on both surfaces; bractlets subtending the individual flowers broadly elliptic-subovate, about 5 mm. long and 3 mm. wide, acuminate at the apex, asperulous-strigillose and resinous-glandular on the back; corolla exserted, its tube about 5 mm. long, densely resinous-glandular and puberulous on the outside, the limb 4—5 mm. wide, glabrous on both surfaces or slightly resinous at the base on the outside.

The type of this handsome and very distinct species was collected by Erik Leonard Ekman (no. 1974) -- in whose honor it was named — at Posadas, Misiones, Argentina, in 1907 or 1908, and is

deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The species has been found on shrubby campos, at an altitude of 350 meters, flowering in January. Material has been misidentified and distributed in herbaria under the names L. hirta Schau. and Dipterocalyx glabrescens Cham.

In all, 4 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Rio Grande do Sul: Jürgens 454 (B); Rambo 3041 (Rb). ARGENTINA: Misiones: Ekman 1974 (F-photo of type, N--isotype, N--photo of type, S--type, Si--photo of type, Z--photo of type).

LIPPIA ELEGANS Cham., Linnaea 7: 225--226. 1832.

Bibliography: Cham., Linnaea 7: 225--226. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 598. 1843; Walp., Repert. Bot. Syst. 4: 51. 1845; Schau. in A. DC., Prodr. 11: 575. 1847; Schau. in Mart., Fl. Bras. 9: 223. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 540. 1911; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 46. 1947; Moldenke, Alph. List Cit. 2: 364, 367, 485, 551, 553, & 581 (1948), 3: 669, 751, 837, 846, & 900 (1949), and 4: 984, 1106, 1132, 1134, 1135, 1168, 1203, 1204, 1208, 1293, 1296, & 1300. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 189. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 348. 1951; Moldenke, Résumé 93 & 461. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 12: 47. 1965.

Shrub or small shrub, 1--2 m. tall; branches obsoletely tetragonal, decidedly virgate, strict, erect, subtomentose-pubescent; leaves decussate-opposite; petioles about 6 mm. long; leaf-blades bicolored, ovate-oblong, about 4 cm. long and 1.5 cm. wide, about as long as the internodes, diminishing in size upwards, obtuse at the apex, crenulate along the margins, acute at the base, rugose, calvescent above, tomentose beneath; secondaries about 8 per side, the lowest issuing from the apex of the petiole; inflorescence spicate, aggregate, axillary; peduncles 6--12 mm. long, lax, about equaling the petioles and half as long as the spike; spikes 1.4--2.5 cm. long, 4-quetrous, ovoid; bractlets imbricate, broadly ovate, about equaling the corolla-tube, subacuminate-mucronulate, conduplicate, ciliate on the margins, the thick midrib forming a keel and slightly excurrent; calyx tubular, about 2 mm. long, lax, pubescent; corolla white or nearly white to cream or yellowish-white, pubescent on the outside, rarely pilosulous below the mouth within, the tube straight, about 4 mm. long, clavate, the limb unequally 4-fid, the dorsal segment 2-lobed, the lobes obtuse and entire; stamens didynamous, inserted above the middle of the corolla-tube; anthers minute, subrotund.

The type of this species was collected by Friedrich Sellow somewhere in Brazil ["E Brasilia misit Sellow"], probably at Villa Rica, Minas Gerais, and was deposited in the herbarium of the Botanisches Museum at Berlin, but is now destroyed.

Chamisso (1832) says "Genus in fructu deficiente recognoscendum. Cave ne pro fructu vel germine grossificato habeas tubum corollae icto insectorum transformatum, obovoideum globosumve, tubi immutata parte coronatum, falsa specie apiculatum, hirsutum; sectione instituta carnosum, cavo axili unico vacuo pervium." He also notes "Habitu inflorescentiaque superioti [L. sidoides] similis". Lippia origanoides H.B.K. is given as a synonym of L. elegans by Schauer (1847 & 1851), but is actually a separate, albeit closely related, species of northern South America.

Lippia elegans has been found in xerophytic sandy rocky soil, in woods and cerrado, on campos and waste land, on dry open riverbanks, and among limestone rocks, at altitudes of 1000 to 1100 meters, flowering from September to June. A vernacular name recorded for it is "camara braba". Material has been misidentified and distributed in herbaria under the names L. mollis Mart., L. origanoides H.B.K., and L. salviaefolia Cham. On the other hand, the Ule s.n. [Herb. Rio de Jan. 31635], distributed as L. elegans, is actually L. rubiginosa Schau.

The Glaziou 15335, cited below, is listed by Glaziou (1911) as L. salviaefolia Cham., as is also his no. 16286 (from São Paulo] — the latter probably correctly identified. Schauer (1851) cites also J. E. Pohl s.n. [Correa et Formigas], L. Riedel s.n. [Villa Rica], and Sellow s.n. [Villa Rica] from Minas Gerais, as well as J. E. Pohl s.n. [Serra do Caxorro] from Goías.

In all, 64 herbarium specimens have been examined by me.

Citations: BRAZIL: Bahia: Blanchet s.n. [1827] (Cb); A. Lutz 131 (Lz); Schery 507 (N). Matto Grosso: Collector undesignated 32 (Br); F. C. Hoehne, Com. Rondon 1307 (N); J. G. Kuhlmann s.n. [Aquidauana. Sept. 1914; Herb. Comm. Linhas Teleg. 1306] (Sp—31979). Minas Gerais: Bailey & Bailey 1074 (Ba); Brade 13457 [Herb. Rio de Jan. 29531] (N), 13904 [Herb. Rio de Jan. 29530] (N); J. F. de Castro 75 (Sp—31301); P. Clausen 1037 [128] (Br, Br, Br), s.n. [Aug.—April 1840] (Br, Br, Br, N, N); ?Duarte 7848 [Herb. Bradeanum 27899] (N); Gehrt & Hoehne s.n. [Turvo, April 24, 1926] (N, Sp—17462); Glaziou 15335 (Br); F. C. Hoehne s.n. [Santa Barbara, Jan. 10, 1921] (N, N, Sp—4859); Jarneby s.n. [near Duradinho, X.1927] (S); Mendes Magalhães 1360 [Herb. Jard. Bot. Bello Horiz. 40016] (N, Si); Mosén 971 (N, S, S); Pizarro 118 (Sg—68299); Regnell III.942 (Cp, Cp, Lu, N, S, S), III.942b (S), III.942x (N, S, S); Warming s.n. [Lagoa Santa] (N); L. O. Williams 5047 (G, N), 5311 (G, N); Williams & Assis 5841 (G), 6026 (G, N), 6418 (G, N), 6469 (G, N), 7559 (G, N, S). São Paulo: Freire & Zeredo s.n. [Herb. Rio de Jan. 31563] (N); Löfgren 248 (N). State undetermined: P. Clausen 161 (V); Collector undesignated s.n. (V); G. Gardner 2714 (W—1440307); Raben 529 (Br); Tamberlick s.n. (Br).

LIPPIA ELLIPTICA Schau. in A. DC., Prodr. 11: 593. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 593. 1847; Schau. in Mart., Fl. Bras. 9: 250. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 189. 1949; Moldenke, Alph. List Cit. 3: 689 & 824. 1949; Moldenke, Résumé 93 & 461. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 11: 4. 1964; Moldenke, Phytologia 12: 24. 1965.

Shrubby; stems erect, several feet long, paniculate and densely foliose above, glandular-hirtellous; leaves decussate-opposite, ternate, in 4's, or approximate, spreading, elliptic, sessile, obtuse and mucronate at the apex, crenate-serrate along the margins except at the base, subattenuate and entire at the base, penninerved, venose, rather shiny above, scabrous and glandular-pubescent above, pale and nitidulous beneath, glandular-pubescent on the veins beneath, those on the stems larger, 7.5—9 cm. long and 2.5--5 cm. wide; those on the branches smaller, decreasing in size upwards and there oblong; inflorescence paniculate, spreading, foliose, knotty; peduncles filiform, elongate, glandulose-hirtellous; heads globose, about the size of a cherry (Prunus avium); bractlets loosely imbricate, thin-membranous, 5--7-veined, venose-reticulate, lilac, subrotund-ovate, eventually 1--1.2 cm. long and 8 mm. wide, acuminate at the apex, glandular-pubescent and also marked with scattered non-glandular hairs, ciliate along the margins, finally somewhat accrescent; pedicels short; calyx bifid, hirsute, the lobes shortly bidentate; corolla lilac, villous on the outside above, the tube ampliate above, somewhat incurved, the limb 4 mm. wide, venose, the upper lip short, rounded and emarginate at the apex, the lower lip with the middle lobe extended and obovate, the lateral lobes turned forward, ovate, acute at the apex.

The type of this rare species was collected by Johann Emanuel Pohl (no. 160) between Alegeres and Trinidade, Goías, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph no. 17502, but is now destroyed. Schauer (1847) classifies the species in his Section Rhodolippia, Subsection "B". Hayek (1906) says that his L. reticulata differs from this in having much smaller and broader leaves, a different indumentum, smaller heads, shorter petioles, and hirsute bractlets. It has been recorded by me in previous publications from Amazonas, apparently in error.

Only 1 herbarium specimen and 4 mounted phototypes have been examined by me.

Citations: BRAZIL: Goías: J. E. Pohl 160 [Macbride photos 17502] (It—photo of type, Kr—photo of type, N—photo of type, W—photo of type). Minas Gerais: A. P. Duarte 7850 [Herb. Bradeanum 27897] (N).

LIPPIA EUPATORIUM Schau. in A. DC., Prodr. 11: 592—593. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 592—593. 1847; Schau.

in Mart., Fl. Bras. 9: 250. 1851; St. Lag., Ann. Soc. Bot. Lyon 7: 129. 1880; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 695 (1949) and 4: 1296. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Résumé Suppl. 8: 4. 1964; Moldenke, Phytologia 12: 24. 1965.

Small shrub, about 0.6 m. tall, hirtous-tomentose with soft glanduliferous hairs; stems erect, subtetragonal, paniculate above; leaves decussate-opposite, ternate, or in 4's, subsessile, spreading, lanceolate, 5--7.5 cm. long, 1.6--2.4 cm. wide, twice as long as the internodes, acuminate at the apex, crenate-serrate along the margins, attenuate at the base, penninerved, venose-rugose, subcanescent beneath; inflorescence paniculate, indefinitely branched, foliose, centripetal, the branches elongate; peduncles elongate, alternately in 2 or 3 pairs, remote, the upper ones single, all filiform, tetragonal; heads globose, the size of a large cherry (Prunus avium), not much enlarged after anthesis; bractlets imbricate, subherbaceous-membranous, rose-colored, elliptic, subacuminate or obtuse at the apex, glandular-pubescent, with longer eglandular hairs interspersed, ciliate along the margins, finally somewhat accrescent and almost 1.2 cm. long and 0.8 cm. wide; calyx very villous; corolla 6--8 mm. long (when dried), dark-purple, yellow in the throat, glandular-pubescent outside, the tube erect, somewhat ampliate above, the limb small, the lobes short, rounded.

This species is based on a collection made by Johann Emanuel Pohl along the road from Fazendina to Serra de Caretas, Goías, one by George Gardner (no. 3408) from Piauí or Goías in 1844, and one by Ludwig Riedel "in campis editis Chapadao de S. Marcos [Minas Gerais], Augusto m. deflorata", deposited in the Vienna, Leningrad, and Munich herbaria. The first of these was photographed by Macbride in the Vienna herbarium as his type photograph no. 34330.

The species is classified by Schauer (1847) in his Section Rhodolippia, Subsection "B". Material has been misidentified and distributed in herbaria as Hyptis longipes St.-Hil.

In all, 5 herbarium specimens, including cotype material, as well as 11 mounted photographs have been examined by me.

Citations: BRAZIL: Goías: Glaziou 21901 (W--1123623); J. E. Pohl s.n. [Fazendina ad Serra de Caretas; Macbride photos 34330] (Br--cotype, F--photo of cotype, It--photo of cotype, Kr--photo of cotype, N--photo of cotype, N--photo of cotype, N--cotype, Si--photo of cotype, Z--photo of cotype). Goías or Piauí: G. Gardner 3408 (Br--cotype, F--photo of cotype, N--photo of cotype, Si--photo of cotype, Z--photo of cotype). Minas Gerais: A. Saint-Hilaire $C^1$.538 (W--1706203).

LIPPIA FELIPPEI Moldenke, Résumé Suppl. 10: 3, nom. nud. May 2. 1965; Moldenke, Phytologia 10: 171--172, June 18. 1964.

Bibliography: Moldenke, Résumé Suppl. 10: 3. 1964; Moldenke, Phytologia 10: 171--172. 1964.

Small shrublet, with a woody xylopodium; branches few, erect, simple or subsimple, about 60 cm. long, slender, stramineous, striate, rather densely hirtellous with soft gland-tipped hairs, less so toward the base; leaves decussate-opposite, petiolate, mostly drooping-reflexed; petioles slender, 3--7 mm. long, densely glandulose-hirtellous; leaf-blades thin-chartaceous, bright-green above, lighter beneath, cordate-ovate, 1.7--3.2 cm. long, 1.4--2.7 cm. wide, acute at the apex, regularly and coarsely serrate from the apex almost to the base with triangular somewhat antrorse but divergent teeth, cordate or subcordate at the base, glandular-pilose with erect gland-tipped hairs on both surfaces, soft to touch, the larger venation slightly impressed above and prominulous beneath; inflorescence axillary in the uppermost leaf-axils, solitary, surpassing the subtending leaves, ascending; peduncles very slender, 1--2 cm. long, densely glandular-hirtellous with soft spreading whitish hairs; heads globose, about 2 cm. long and wide, apparently rosy-purple, showy; bractlets very numerous, herbaceous, densely imbricate, ovate, to 12 mm. long and 6 mm. wide, venose, acute or short-acuminate at the apex, slightly surpassing the corolla-tube, glandular-pubescent; corolla hypocrateriform, rose, with a yellow central "eye", the tube about 1 cm. long, glandular-pubescent on the outside, the limb about 9 mm. wide.

The type of this handsome species was collected by Gil M. Felippe (no. 140) -- in whose honor it was named -- in a cerrado along the road to the airport, municipality of Prata, Minas Geraais, Brazil, on March 20, 1963, and is deposited in the United States National Herbarium at Washington. The species is known thus far only from the type collection.

In all, 2 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Felippe 140 (W--2426087--type, Z--isotype).

LIPPIA FERRUGINEA H.B.K., Nov. & Gen. Sp. Pl. 2: 265. 1818.

Synonymy: Lippia ferruginea Humb. ex Spreng. in L., Syst. Veg, ed. 16, 2: 751. 1825. Lippia ferruginea Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 54. 1840. Lippia ferruginea Humb. & Kunth ex D. Dietr., Syn. Pl. 3: 596. 1843. Lippia ferruginea Kunth ex Schau. in A. DC., Prodr. 11: 588. 1847. Lippia weberbaueri Moldenke, Suppl. List Invalid Names 6, in syn. 1941.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl. 2: 265. 1818; Spreng. in L., Syst. Veg., ed. 16, 2: 751. 1825; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 596. 1843; Walp., Repert. Bot. Syst. 4: 48. 1845; Schau. in A. DC., Prodr. 11: 588. 1847; Bocq., Adansonia 3: 244. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Phytologia 2: 22. 1941; Moldenke, Suppl. List Invalid Names 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 95. 1942; Moldenke, Alph. List Invalid Names 33. 1942; Raimondi, Bol. Mus. Hist. Nat. Jav. Prado 7: 242. 1943; Moldenke, Alph. List Cit. 1: 318 (1946) and 2: 361 & 573. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 88. 1948; Moldenke, Castanea 13: 116.

1948; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Moldenke, Alph. List Cit. 3: 689 & 893 (1949) and 4: 1067 & 1113. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73 & 190. 1949; Moldenke, Phytologia 4: 70 (1952) and 5: 24. 1954; Moldenke, Résumé 84, 318, & 461. 1959; Moldenke, Résumé Suppl. 8: 4 (1964) and 11: 4. 1964; Moldenke, Phytologia 12: 24. 1965.

Shrub or small shrub, about 1.5 m. tall, very fragrant with a strong spicy fragrance which persists even after drying; branches very slender, tetragonal, slightly sulcate, brown, minutely appressed-puberulent on the youngest parts, glabrescent in age; twigs short, appressed-puberulent; principal internodes 2--28 mm. long, very short on lateral twigs; nodes not plainly annulate; leaf-scars comparatively large, elongate-elevated and prominent, divergent; leaves decussate-opposite, small; petioles very slender, 1--3 mm. long, appressed-puberulent; leaf-blades thin-chartaceous, grayish-green above, light-green beneath, obovate or obovate-elliptic, 0.9--2.3 cm. long, 3--11 mm. wide, rounded at the apex, cuneate at the base, repand-dentate from the widest part to the apex, minutely appressed-strigillose or pulverulent-puberulent above, more densely appressed-puberulent (with very minute hairs) and glandulose beneath; midrib, the numerous straight ascending secondaries, and the veinlet reticulation rather deeply impressed above and prominulous beneath; inflorescence axillary, capitate, few-flowered; peduncles filiform, 5--10 mm. long, weak, appressed-puberulent; heads about 5-flowered, lax; bractlets broadly elliptic or ovate, about 2 mm. long and wide, appressed-puberulent, acute at the apex; corolla white, hypocrateriform, about 5 mm. long, its limb 3 mm. in diameter.

The type of this species was collected by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland at Huanacabamba, in the province of the same name, Piura, Peru, at an altitude of 1900 to 2000 meters, and is deposited in the Bonpland Herbarium at the Muséum National d'Histoire Naturelle at Paris — an isotype in the herbarium of the Botanisches Museum at Berlin was photographed by Macbride and is type photograph no. 17503, but is now destroyed. The type of L. weberbaueri was collected by August Weberbauer (no. 6066) at the same locality in April, 1912, and is deposited in the herbarium of the Chicago Natural History Museum.

The species has been found in full exposure to the sun at altitudes of 1900 to 2650 meters, flowering in April, May, August, November, and December. Schauer (1847) classifies it in his Section Zapania, Subsection Axilliflorae. A vernacular name recorded for it is "poleo del monte". Raimondi (1943) cites his nos. 3875 from Cajamarca, 1057 from Amazonas, and 2325 from Piura, Peru. In previous publications I recorded it from Junín, apparently in error.

In all, 8 herbarium specimens and 8 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: PERU: Amazonas: Ferreyra 7103 (W--2101305). Apurimac:

Vargas 9984 (N). Piura: Humboldt & Bonpland s.n. [Huanacabamba; Macbride photos 17503] (It--photo of isotype, Kr--photo of isotype, N--photo of isotype, N--photo of isotype, W--photo of isotype); Sandeman 4261 (K, K, W--2210961); Weberbauer 6066 (F--548669, N, N--photo, N--photo, W--1495407, Z--photo).

LIPPIA FILIFOLIA Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 586. 1847.

Synonymy: Lippia filifolia Mart. ex Moldenke, Résumé Suppl. 11: 7, in syn. 1964.

Bibliography: Schau. in A. DC., Prodr. 11: 586. 1847; Schau. in Mart., Fl. Bras. 9: 239. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 107 & 238 (1946), 3: 691, 712, & 731 (1949), and 4: 1204. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Résumé Suppl. 11: 7. 1964; Moldenke, Phytologia 12: 24. 1965.

Bush, subshrub, or shrub, 0.5--1 m. tall, aromatic; stems woody, very slender, tetragonal, sulcate, few-branched above, glabrous or glandular-roughened; leaves approximate, ternate, or verticillate, sessile, subtetragonal-filiform, inclined, bright-green, 1.2--2.5 cm. long, 1 mm. or less wide, obtuse at the apex, attenuate at the base, wider and flat on the sides, punctate, glandular-roughened or glabrous, deeply sulcate and very narrowly linear when viewed from above, the angles scabrous with a few prickles; peduncles solitary in the upper leaf-axils, filiform, striate, greatly surpassing the subtending leaves, glandular-roughened or glabrous; heads hemispheric, about 6 mm. wide; bractlets imbricate, subherbaceous, ovate-subrotund, obtusely subacuminate, glandular-pubescent on both surfaces, half as long as the corolla-tube, the outer ones larger and involucrate; calyx hirsute, acutely bifid; corolla yellow or orange, puberulent on the outside, also pulverulent-glandulose above, the tube about 6 mm. long, subventricose at the middle, the limb undulate, velutinous, the throat pubescent.

This most distinct species is based on two collections made by Carl Friedrich Philipp von Martius on desert campos in Minas Geraais, Brazil -- at Serra de São Antonio and between Lavras de Pindaiba and São Dominici -- and one by Ludwig Riedel in thickets at Serra da Lapa. The former is deposited in the herbarium of the Botanische Staatsammlung at Munich, where it was photographed by Macbride as his type photograph no. 20324.

Schauer (1847) classifies the species in his Section Zapania, Subsection Axilliflorae. It has been found also in open gravelly pastures, at 1170 meters altitude, flowering from May to July and in November, and is said by Mexia to be "frequent" along the railroad in the Diamantina district.

In all, 15 herbarium specimens and 6 mounted photographs, including phototype material of both names involved, have been examined by me.

Citations: BRAZIL: Minas Gerais: Brade 13902 [Herb. Rio de Jan. 29528] (B); P. Clausen 635 (S), s.n. (Cb, Cb, N); Glaziou 19535 (Cp, N--photo, S--photo, Z--photo); Martius s.n. [Macbride photos 20324] (Kr--photo of cotype, N--photo of cotype, W--photo of cotype); Mexia 5889 (Au--121164, Ca--509370, Gg--286581, Go, I, Mi, N, S, W--1705025).

LIPPIA FLAVIDA Urb., Symb. Antill. 7: 353. 1912.

Bibliography: Urb., Symb. Antill. 7: 353 (1912) and 8: 594--595. 1921; Prain, Ind. Kew. 5: 153. 1921; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 26 & 95. 1942; Moldenke, Alph. List Cit. 1: 188 (1946) and 4: 1258 & 1259. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 48 & 190. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Moldenke, Résumé 57 & 461. 1959.

Shrub, 0.6--1.3 m. tall; young branches obtusely angular, densely short-pilosulous with simple white hairs, the older ones more or less plainly tetragonal and glabrous; principal internodes 2--4 cm. long; leaves decussate-opposite, thick-coriaceous, rigid; petioles 2--3 mm. long; leaf-blades narrowly ovate or ovate-elliptic, 1.5--2 cm. long, 0.8--1.2 cm. wide, obtuse or subobtuse at the apex, coarsely crenate along the complete margins, obtuse at the base and slightly prolonged into the petiole, scabrous above, very densely short-pilose beneath; midrib and the 6 or 7 secondaries on each side impressed and reticulate-joined above, with the areolae prominulous, coarsely prominent beneath and rather plainly reticulate-joined beneath the pubescence; inflorescence solitary in the leaf-axils, subsessile or short-pedunculate, to 7 mm. long and 5 mm. wide, globular or finally short-ovate; peduncles to 5 mm. long, 0.4--0.5 mm. thick; involucral bractlets short-obovate or orbicular-obovate, rounded at the apex, not conspicuous, 2--2.5 mm. long, 1.2--1.8 mm. wide, entire, more or less reflexed above, the inner ones narrower and subspatulate, scarcely 2 mm. long; flowers fragrant; sepals 2 or 3, free, the lateral ones linear, 1.5 mm. long, somewhat dilated above, the anterior one much shorter or absent; corolla white to yellowish or pale-yellow, glabrous toward the base, very shortly spreading-pilose above, the tube cylindric, about 2.5 mm. long, slightly ampliate above, sparsely pubescent within, the limb 4-lobed, the posterior lobe semiorbicular, the anterior short-ovate; lower stamens inserted at the middle of the corolla-tube, the upper higher; filaments very short; style about 1 mm. long; stigma oblique, almost unilateral; ovary suborbicular, wider and subtruncate at the top, glabrous.

The type of this species was collected by Wilhelm Buch (no. 394) in dry places near Ennery, at 400 meters altitude, Haiti, Hispaniola, in June, and is deposited in the herbarium of the Botanisches Museum at Berlin. Urban (1912) says of it "Habitu similis A. geminatae H.B.K. var. microphyllae Griseb., quae foliis apice acutis, supra laevibus, capitulis majoribus, bracteis triangularibus v. semiorbicularibus apice acutis v. acuminatis,

corollis violaceis, calyce ovarium obtegente inferne tubuloso, superne bilobato omnino discrepat." The abbreviation, "A.", for the generic name in this quotation is obviously an error for "L." [=Lippia]. Urban's description of the calyx of L. flavida being composed of 2 or 3 free [separate] sepals is curious. It is more probable that the calyx is merely deeply and irregularly split.

The species has been found in dry places, pinelands, and dry thickets, as well as on shrubby mountain slopes, at altitudes of 325 to 1800 meters, flowering and fruiting in June, September, and November. Ekman refers to it as "common" and records the vernacular name "San José". Urban cites also Buch 1304. The flowers are said to have been white on Buch 1304 and yellowish on Buch 394.

In all, 8 herbarium specimens, including material of the type collection, have been examined by me.

Citations: HISPANIOLA: Dominican Republic: Ekman H.11927 (S). Haiti: W. Buch 394 (N--isotype); Ekman H.1817 (Mi, S), H.2471 (S), H.4970 (Ca--608095, S); E. C. Leonard 8901 (N).

LIPPIA FLORIDA Cham., Linnaea 7: 221--222. 1832.

Bibliography: Cham., Linnaea 7: 221--222. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 597. 1843; Walp., Repert. Bot. Syst. 4: 46--47. 1845; Schau. in A. DC., Prodr. 11: 592. 1847; Schau. in Mart., Fl. Bras. 9: 249. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 100. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 106 (1946), 3: 689, 754, & 921 (1949), and 4: 1075, 1135, 1203, 1204, & 1301. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Mendes Magalhães, Anais V. Reun. Anual Soc. Bot. Bras. 268--269. 1956; Moldenke, Résumé 93 & 461. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 12: 24. 1965.

Shrub, 40--80 cm. tall, subtomentose-pubescent with glanduliferous hairs or subglandular-tomentose; branches elongate, 45 cm. long or longer, erect, simple, strict, straight, about as thick as a crow feather quill, tetragonal or obsoletely angular, abundantly nodose, foliose above, leafless below and with the persistent glabrescent peduncles of the previous season; principal internodes usually about 1.2 cm. long, more rarely to 2.5 cm.; leaves decussate-opposite or ternate, sessile, subimbricate, borne on the young growth at the apex of the branches, obovate-cuneate, obtuse or rather subacute at the apex, crenulate along the margins except at the entire base, penninerved, rugose or subrugose, reticulate-venose, soft-pubescent on both surfaces, the lower ones about 2.5 cm. long and 8--10 mm. wide, diminishing in size upwards, a few only persisting at the apex of the branches; secondaries 6--10 per side; peduncles axillary or pseudo-terminal, solitary, much surpassing the leaves, 1--8 in the upper leaf-axils, congested at the tips of the branches and surrounding the

terminal bud, 4--5 cm. long; heads conspicuous, hemispheric, about 5 cm. wide, nutant, abundant, pilose-pubescent with hairs less abundant than on the leaves; old flowerless rachids to 1 cm. long; bractlets petaloid, rose-lilac or rose, thin-membranous, broadly ovate, very large, about 2.5 cm. long, 1.6--1.8 cm. wide when mature, 3--7-veined, reticulate-venose, glandular-pilose or subglandular-pubescent on both surfaces, ciliate along the margins, the outer ones smaller, firmer, more densely pilose, and very obtuse at the apex, the inner ones acute or subacuminate at the apex; calyx small and short, villous or very villous, bifid, obtusely 4-dentate; corolla hypocrateriform, "rose or rose-lilac" to yellow or "yellow and violet", glabrous at the base outside, glandular-pubescent above, villous or villosulous in the throat from the insertion of the stamens to the mouth, the tube curvate, to 6 mm. long, ampliate above, the limb small; stamens didynamous, inserted at the middle or below the middle of the corolla-tube; filaments twice as long as the anthers; anthers ovate; style and fruit typical of the genus.

The type of this very distinct species was collected by Friedrich Sellow (no. B.1439 c.495) at Serro do Ouro, Minas Gerais, Brazil -- the original publication states merely "E Brasilia misit Sellow" -- and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph no. 17506, but is now destroyed. Chamisso (1832) describes the bractlets as "imprimis autem in exteriori, qua nervos venasque densiores opacant" and "Capitulis floridis cum subsequenti specie [L. lupulina Cham.] caeterum diversissima conveniens." Schauer (1847) classifies it in his Section Rhodolippia, Subsection "B".

The flowers are described as "yellow" on Williams & Assis 7160 and as "yellow and violet" on Mendes Magalhães 3014. It seems probable to me that the corolla is actually yellow, while the conspicuous subtending bractlets are rose, rose-lilac, or violet.

The species has been found on dry and sandy campos, at an altitude of 1300 meters, flowering and fruiting in April and from June to October. Material has been misidentified and distributed in herbaria as L. bracteata Carr. Clausen's surname is misspelled "Glaussen" in the Vienna herbarium. M. B. Foster 713 is a mixture with L. lupulina Cham. Schauer [1851] cites also a P. Clausen 390 and Schott s.n. from Minas Gerais and two collections of L. Riedel from "in campis arenosis inter Rio S. Francisco er Curvellos" and "in campis siccis prope Caitete" in Bahia, deposited in the Berlin, Leningrad, Martius (Munich), and Vienna herbaria. Glaziou (1911) cites his no. 15337 from Minas Gerais and says of it "frutescent, fl. roses. juin-juillet. R."

In all, 13 herbarium specimens and 3 mounted phototypes have been examined by me.

Citations: BRAZIL: Minas Gerais: P. Clausen 221 (V), 390 (Br), 609 [10] (S), s.n. [Aug.--April 1840] (Br); A. P. Duarte 3084

[Herb. Jard. Bot. Rio Jan. 71926] (N); Dupré s.n. [Brésil méridional, 1842] (N); Heringer 5290 (Z); Mello Barreto 3275 [Herb. Jard. Bot. Bello Horiz. 612] (N); Mendes Magalhães 3014 (Be--13913, W--2124262); M. B. Foster 713, in part (W--1779145); Sellow B.1439 c.495 [Macbride photos 17506] (Kr--photo of type, N--photo of type, W--photo of type); Williams & Assis 7160 (G, N).

LIPPIA FORMOSA T. S. Brandeg., Proc. Calif. Acad. Sci., ser. 2, 3: 163. 1891.

Bibliography: T. S. Brandeg., Proc. Calif. Acad. Sci., ser. 2, 3: 163. 1891; Durand & Jacks., Ind. Kew. Suppl. 1: 250. 1903; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1244 & 1246. 1924; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 14 & 95. 1942; M. Martínez, Bol. Soc. Bot. Mex. 2: 2 & 13. 1945; Moldenke, Alph. List Cit. 1: 233 (1946), 2: 474, 489, & 595 (1948), 3: 933 (1949), and 4: 1121, 1181, 1241, 1242, & 1244. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31 & 190. 1949; Calpouzos, Econom. Bot. 8: 228. 1954; B. H. Johnson, Wasman Journ. Biol. 16: 241 & 295. 1958; Moldenke, Résumé 37 & 461. 1959; Moldenke, Phytologia 12: 47. 1965.

Rather slender erect shrub, 2--4 m. tall, scabrous-pubescent; bark smooth, white or mottled-gray; stems many from the ground, slender, erect; leaves decussate-opposite, obovate-cuneate, 2--2.5 cm. long, coarsely crenate-dentate, prominently pinnate-veined, rugose, scabrous above, the pubescence longer and softer beneath; peduncles axillary, twice as long as the leaves; heads 2--2.5 cm. wide; bracts membranous, cordate, 1--1.5 cm. long and wide, light rose-color or brownish-lavender, reticulate-veined, minutely pubescent, the outer ones acute at the apex, the inner ones obtuse; flowers rather showy; calyx 2-cleft, densely long-pubescent with white hairs; corolla light rose-colored or pale-pink to white, or "from pale to deep pink with yellow ring at mouth of throat", 6 mm. long, the tube twice as long as the calyx, ampliate above; fruit 2--3 mm. long, the cocci easily separable.

The type of this species was collected by Townshend Stith Brandegee on the hills about Tocos Santos in the Cape Region of Baja California, Mexico, in or before 1891, and is probably deposited in the herbarium of the California Academy of Sciences at San Francisco.

The plant has been found along the edge of sandy arroyos, in broad open washes or sandy valley lands near washes, at the base of rocky cliffs, on hills, and in Jatropha and Bursera association on the coastal plain, flowering in October and from December to March, and fruiting in February and March. It should be noted that the original description says "2--4 mm. high", which I assume to be a typographic error for "2--4 m."

The Whitehead 862 collection cited below bears a notation "same as number 863", but I have as yet not seen the latter collection. The Gradendörfer s.n. distributed as L. formosa is actu-

ally Lantana camara var. mista (L.) L. H. Bailey.

Lippia formosa is one of the many plants called "oregano", "oregeno", "origano", or "oragano". Others are L. affinis Schau., L. fragrans Turcz., L. graveolens H.B.K., L. micromera Schau., L. micromera var. helleri (Britton) Moldenke, L. origanoides H.B.K., L. palmeri S. Wats., L. palmeri var. spicata Rose, Lantana involucrata L., L. achyranthifolia Desf., L. trifolia L., Coleus amboinicus Lour., Hedeoma floribunda Standl., H. patens Jones, Hyptis albida H.B.K., H. americana (Aubl.) Urb., H. capitata Jacq., H. suaveolens (L.) Poit., Limnophila stolonifera (Blanco) Merr., Monarda austromontana Epl., Ocimum basilicum L., Origanum vulgare L., O. majorana L., Poliomintha longiflora Gray, and Salvia sp. Martínez states that (1945) Lippia formosa is the "orégano" of the Todos Santos region, while that of Miraflores is L. palmeri and that of Comondú and Mulegé is Aloysia barbata (T. S. Brandeg.) Moldenke.

In all, 34 herbarium specimens, including numerous topotypes, and 2 mounted photographs have been examined by me.

Citations: MEXICO: Baja California: T. S. Brandegee s.n. [Todos Santos, 1890] (G--isotype), s.n. [Pescadero, Nov. 1892] (G), s.n. [Pescadero, Oct. 23, 1893] (Ca--104914), s.n. [Pescadero, Sept. 20, 1893] (A, G), s.n. [Pescadero, Nov. 1902] (Vt); Carter, Alexander, & Kellogg 2291 (Ca--760098, Du--349169, G); H. S. Gentry 4444 (Du--264176, Fs, Ge); Hammerly 256 (Gg--294854); M. E. Jones 24112 (Ca--400367, Fs, La, Mi, N, N, N--photo, Po--153922, Z--photo), 24357 (A, Fs, Po--153923, Sd--25470); Moran 6979 (G); Nelson & Goldman 7334 (G); Shreve 7215 (Du--242676, Fs, G, Mi); J. Whitehead 862 (Du--248546, La); Wiggins 14536 (Au--190209, G).

LIPPIA FRAGRANS Turcz., Bull. Soc. Nat. Mosc. 36 (2): 203. 1863.

Synonymy: Buddleja geisseana R. A. Phil., Anal. Univ. Chil. 91: 111. 1895. Lippia geisseana (R. A. Phil.) Solered., Bull. Herb. Boiss., sér. 1, 6: 623--629. 1898. Buddleia geisseana R. A. Phil. ex Solered., Bull. Herb. Boiss., sér. 1, 6: 624, in syn. 1898. Lippia geisseana Solered. ex Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904. Buddleyia geisseana Phil. ex Moldenke, Résumé Suppl. 11: 6, in syn. 1964.

Bibliography: Turcz., Bull. Soc. Nat. Mosc. 36 (2): 203. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; R. A. Phil., Anal. Univ. Chil. 91: 111. 1895; Solered., Bull. Herb. Boiss., sér. 1, 6: 623--629. 1898; Durand., Ind. Kew. Suppl. 1: 65. 1901; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Baeza, Nomb. Vulg. Pl. Silv., ed. 2, 162 & 257. 1930; Moldenke, Suppl. List Common Names 16. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42 & 95. 1942; Moldenke, Phytologia 2: 107. 1945; Moldenke,

Castanea 10: 42. 1945; Moldenke, Alph. List Cit. 1: 231. 1946; Moldenke, Alph. List Invalid Names 14. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 60. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 101 & 190. 1949; Calpouzos, Econom. Bot. 8: 228. 1954; Muñoz Pizarro, Sin. Fl. Chil. 199. 1959; Moldenke, Résumé 121 & 461. 1959; Moldenke, Résumé Suppl. 1: 7, 16, & 19 (1959) and 11: 6. 1964; Moldenke, Phytologia 12: 47. 1965.

Glabrous shrub, to 60 cm. tall, persistently fragrant; stems terete, intricately branched, often leafless below; branches deeply 6--8-sulcate, about 1.5 mm. in diameter, completely glabrous or glandular-pulverulent within the sulcations, the lateral floriferous ones 9--11 cm. long and about 1 mm. in diameter; principal internodes 1.5--2.3 cm. long; leaves decussate-opposite, sessile or subsessile; leaf-blades lanceolate or (the upper) linear-lanceolate to oblong-obovate, 1.2--1.8 cm. long, about 4 mm. wide, obtuse at the apex, entire, long-attenuate at the base, subcoriaceous, sticky with microscopic glands, hirtous above with simple hairs, the upper ones only about 8 mm. long and 1.5 mm. wide or even smaller; inflorescence paniculate, 1.7—2.5 cm. long, with decussate branches; peduncles 1--1.4 cm. long, the upper ones smaller; heads axillary and terminal, ternate, rarely solitary, congested above, centripetal, subglobose, as long as or longer than the peduncles, 5--7 mm. wide; bractlets concave or more or less convex, oblong or broadly ovate, almost or completely hiding the flowers, imbricate, sticky, densely long-pilose on the outer surface and on the margins, the lower ones obovate, 3—4 mm. long, 2--3 mm. wide; flowers small, sessile, solitary in the axils of the bractlets; calyx 2-fid, the sepals 2, oblong, 3.5--4 mm. long, about 1 mm. wide, truncate and more or less bidentate at the apex, densely villous on the outer surface and on the margins, with numerous microscopic glands especially on the lower part; corolla hypocrateriform, vivid white, becoming yellowish in drying, its tube cylindric, erect, about 4 mm. long, glabrous, the limb oblique, 4-fid, spreading, the anterior lobe mostly broader, about 1.5 mm. long and 1 mm. wide, and obscurely 1-lobulate on each side at the base, the posterior lobe more or less 2-parted at the apex, about 1 mm. long and wide; stamens 4, the 5th completely aborted, inserted above the middle of the corolla-tube and about 3 mm. above the base, included; anthers subsessile, almost oblong, the thecae parallel, free at the base, attached near the apex, the connective terminated by a clavate dorsal appendage which is glanduliferous at the apex and hardly exserted; style terminal, short, included, about 1 mm. long, incrassate at the apex; stigma declined, lateral; ovary small, surpassing the style in length by 1.5 mm., entire, 1-carpellary, 2-celled, with one ovule in each cell; fruit not known.

The type of this curious species was collected by J. H. Bridges (no. 1347) in Coquimbo, Chile. It is most probable that the Cuming 1347, cited below, is part of the same collection. The type of Buddleja geisseana was collected by Wilhelm Geisse (no. 49) — in whose honor it was named — near Bandurrias, Atacama, Chile, be-

tween 1885 and 1887. Turczaninow (1863) says of the species: "Planta per plures annos exsiccata odorem suavem spargit, species distinctissima ramis intricatis, inferioribus saepe aphyllis, Lippia trifidam Gay in mentem revocans."

The common name "orégano" is recorded for this species. In fact, this is only one of many plants called "oregano", "oregeno", "origano", or "oragano". Others are L. affinis Schau., L. formosa T. S. Brandeg., L. graveolens H.B.K., L. micromera Schau., L. micromera var. helleri (Britton) Moldenke, L. origanoides H.B.K., L. palmeri S. Wats., L. palmeri var. spicata Rose, Lantana involucrata L., L. achyranthifolia Desf., L. trifolia L., Coleus amboinicus Lour., Hedeoma floribunda Standl., H. patens Jones, Hyptis albida H.B.K., H. americana (Aubl.) Urb., H. capitata Jacq., H. suaveolens (L.) Poit., Limnophila stolonifera (Blanco) Merr., Monarda austromontana Epl., Ocimum basilicum L., Origanum vulgare L., O. majorana L., Poliomintha longiflora Gray, and Salvia sp. Solereder (1898) says "Die Bezeichnung 'Oregano' und die verwandte Bezeichnung 'Oreganillo' wird in Chile und Argentinien auch für einige andere starkriechende Pflanzen gebraucht, Oregano für Origanum majorana L.....und Oreganillo für Lippia lycioides Steud.....und die Labiate Gardoquia Gillesii Gay.....Der Geruch der Lippia Geisseana ist ein ganz charakteristischer und nicht gerade angenehmer; er erinnert mich an den Geruch der harzigen Larrea mexicana Moric. (Zygophyll.) der Yuma- und Arizona-Wüste und einiger anderer nord-amerikanischer Wüsten-pflanzen." He also says: "Vidi specimina a cl. Geisse lecta in Herb. Berolinensi, 'Herb. of the California Academy of sc.' ('Chaffarcillo') et 'Herb. Columbian College New-York' ('W. Geisse no. 49, 1885--87, Desert of Atacama')."

In all, 3 herbarium specimens and 3 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: CHILE: Atacama: Geisse 49 (C); R. A. Philippi 1265 (W--1352984). Coquimbo: Bridges 1347 (Z--photo of type, Z--photo of isotype, Z--photo of isotype); Cuming 1347 (N--isotype).

LIPPIA FRANCENSIS Moldenke, Phytologia 2: 20. 1941.

Bibliography: Moldenke, Phytologia 2: 20. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 231 (1946) and 2: 364. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 93 & 461. 1959.

Probably shrubby; stems apparently simple, erect, slender, rather acutely tetragonal, densely hirsute with stiff whitish hairs and shorter gland-tipped hairs, velutinous to the touch; nodes annulate with a band of denser hirsute hairs; principal internodes 1--4.5 cm. long; leaves decussate-opposite; petioles slender, 2--5 mm. long, densely white-hirsute; leaf-blades coriaceous, elliptic-subrotund, somewhat lighter beneath, 1.2--4 cm.

long, 1—2.8 cm. wide, rounded at the apex and base, regularly serrate from the apex to the base with rounded revolute-margined teeth, densely hirsute on both surfaces, subvelutinous and densely resinous-punctate beneath; midrib, secondaries, and veinlet reticulation deeply impressed above, very prominent beneath; secondaries 5 or 6 per side, ascending, not much arcuate; inflorescence axillary, borne at the tips of the stems, usually 2 pairs, capitate; peduncles very slender, 0.8—3.5 cm. long, very densely hirsutulous with stiff white gland-tipped hairs; heads hemispheric, about 2 cm. in diameter, many-flowered; bracts large, foliaceous, red, ovate, to about 10 mm. long and 8 mm. wide, blunt at the apex, densely pubescent with short silky mostly gland-tipped hairs, ciliate-margined; corolla yellow or "yellow and rose".

The type of this handsome species was collected by Guilherme Gehrt [Herb. Inst. Bot. São Paulo 4037] in fields at Franca, São Paulo, Brazil, on April 11, 1920, and is deposited in the Britton Herbarium at the New York Botanical Garden. It was originally distributed as L. lupulina Cham., to which the species is obviously closely related. Thus far it is known only from the original collection, of which two herbarium specimens have been examined by me.

Citations: BRAZIL: São Paulo: G. Gehrt s.n. [Franca, April 11, 1920] (N—type, Sp—4037—isotype).

LIPPIA GARDNERIANA Schau. in A. DC., Prodr. 11: 592. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 592. 1847; Schau. in Mart., Fl. Bras. 9: 248—249. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 222. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 60. 1948; Moldenke, Alph. List Cit. 3: 693 (1949) and 4: 1296. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Phytologia 12: 24. 1965.

Shrubby, pilose-hirsute and more shortly glandular-pubescent throughout; branchlets obsoletely tetragonal; leaves decussate-opposite, sessile, cordate-ovate, 1.2—1.5 cm. long, 1—1.2 cm. wide, acute at the apex, cordate and semiamplexicaul at the base, reflexed or subrevolute and coarsely dentate-serrate along the margins with acute teeth, reticulate-veined and coarsely venose-rugose, subbullate and hirtellous above, with shorter glandulif-erous hairs very closely interspersed throughout, punctate on the glabrous portions beneath; vein and veinlet reticulation prominent beneath and especially pilose; peduncles axillary and terminal, single, subequaling the subtending leaves, subpaniculate at the apex of the branchlets; heads finally ovate, about 2 cm. long, pale-lilac in color; bracts thin-membranous, oblong, finally 1.2 cm. long, 4—4.5 mm. wide, subacute at the apex, many-veined and finally reticulate-venose, eventually exceeding the flowers, pilose-hirsute and glanduliferous on both surfaces; calyx very hirsute, slightly less than 2 mm. long, short-dentate; corolla like that of L. lupulina, its tube about 8 mm. long, curvate,

ventricose below the middle, pubescent above.

The type of this rare species was collected by George Gardner (no. 3407) -- in whose honor it was named -- in Piauí or Goías, Brazil, in 1844, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where it was photographed by Macbride as his type photograph no. 24652. Schauer (1847) places the species in his Sebsection "B" of Section Rhodolippia and notes "Proxima habituque simillima L. lupulinae, sed foliis bracteisque aliena." It us known thus far only from the original collection. The A. Lutz 1096, distributed as L. gardneriana, is actually L. diamantinensis Glaz., while J. E. Pohl s.n. [Herb. Caes. Vindob. 1847 comm.] is L. hederaefolia Mart. & Schau.

In all, 2 herbarium specimens and 8 mounted photographs of the type collection have been examined by me.

Citations: BRAZIL: Goías or Piauí: G. Gardner 3407 [Macbride photos 24652] (Br--isotype, F--photo of isotype, It--photo of type, Kr--photo of type, N--isotype, N--photo of type, N--photo of isotype, Si--photo of isotype, W--photo of type, Z--photo of isotype).

LIPPIA GEHRTII Moldenke, Phytologia 1: 453--454. 1940.

Bibliography: Moldenke, Phytologia 1: 453--454 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 231 & 290. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 60. 1948; Moldenke, Alph. List Cit. 2: 362 & 365 (1948), 3: 846 (1949), and 4: 1094. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93 & 461. 1959.

Shrub; branches and branchlets slender, obtusely tetragonal, densely hispid with harsh white divergent hairs 2.5--3 mm. long; nodes hidden, but apparently more or less annulate; principal internodes 0.9--3 cm. long; leaves decussate-opposite; petioles slender, 3--7 mm. long, canaliculate above, more or less wing-margined, densely white-hispid like the branchlets; leaf-blades chartaceous, rather uniformly dark-green on both surfaces, broadly elliptic or subovate, 1--4 cm. long, 0.7--3.2 cm. wide, rounded at the apex, regularly serrate-dentate from the base to the apex with rounded or subacute, broad, short teeth, truncate or subtruncate at the base (varying to acuminate and prolonged into the petiole on young twigs), abundantly hirsute on both surfaces with long white hair similar to that on the branchlets; midrib slender, impressed above, prominent beneath; secondaries slender, 4--6 per side, arcuate-ascending, impressed above, prominulous beneath; veinlet reticulation abundant, impressed above, prominulous beneath; inflorescence borne in terminal open panicles, consisting of 2 or 3 (or more) decussate pairs of stipitate heads and a sessile terminal one, the stipitate ones about 1.5--2.5 cm. long, subtended by a pair of foliaceous bracts which are similar to the smaller leaves in all respects or are somewhat obovate, 6--15 mm.

long and 5—10 mm. wide (or larger), short-stipitate, densely hispid on both surfaces; axillary heads also often present in the uppermost leaf-axils beneath the panicle; inflorescence-branches densely white-hispid like the branchlets; heads oblong, 1.2--1.7 cm. long, 1--1.5 cm. wide, densely many-flowered; bractlets large and conspicuous throughout the head, ovate, sessile, very thin-textured, 5--7 mm. long, about 4 mm. wide at the base, sharply acute at the apex, softly pubescent with multicellular whitish somewhat bulbous-based hairs which are dense on the margins and more scattered on the body of the bractlets; corolla hypocrateriform, rose, about 8 mm. long, its limb about 5 mm. in diameter.

The type of this species was collected by Guilherme Gehrt [Herb. Inst. Bot. S. Paulo 8313] — in whose honor it is named -- at Itarapina, São Paulo, Brazil, on April 29, 1923, and is deposited in the Britton Herbarium at the New York Botanical Garden. Material has been misidentified and distributed in herbaria as L. lupulina Cham. The species has been collected in anthesis in January, April, and July.

In all, 11 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: BRAZIL: São Paulo: G. A. Black 51-10973 (Ca--91512); G. Gehrt s.n. [Itirapina, April 29, 1923] (N--type, Sp--8313--isotype); Regnell III.946 [7/1855] (N, S, W--201215), III.946x [Batalaes, Feb. 1849] (S), III.946x [inter Canna Verde & São João de Jeguaty, May 5--8, 1848] (N, S), III.946xa (S); Viegas & Normanha s.n. [Herb. Inst. Agron, Est. S. Paulo 5553] (N—photo, Sp—43482, Z—photo).

LIPPIA GENTRYI Standl., Field Mus. Publ. Bot. 17: 207—208. 1937.

Bibliography: P. C. Standl., Field Mus. Publ. Bot. 17: 207--208. 1937; H. S. Gentry, Carnegie Inst. Wash. Publ. 527: 45, 223, 281, & 306. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 95. 1942; Moldenke, Alph. List Cit. 1: 232 & 233. 1946; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 43. 1947; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 60. 1948; Moldenke, Alph. List Cit. 4: 1245. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31 & 190. 1949; Moldenke, Résumé 37 & 461. 1959.

Openly branched rather spindly shrub, 1--5 m. tall, sometimes bushy and densely branched; branches terete, ochraceous, very densely glandular-villosulous with short spreading hairs and more or less short-hirsute; principal internodes short; leaves small, decussate-opposite, short-petiolate; petioles rather thick, 6--8 mm. long, densely glandular-villosulous; leaf-blades subcoriaceous, lanceolate-ovate, 2.5--3.5 cm. long, 1--1.5 cm. wide, gradually narrowed to the acute apex, obtuse or rounded at the base, abundantly serrate with acute teeth along the whole margins, decidedly rugose, very densely glandular-villous above and rough to the touch, gray beneath and very densely pilose with eglandular hairs or sometimes with a few glanduliferous ones interspersed:,

midrib slender, prominent beneath; secondaries about 10 per side, rather straight-ascending or subarcuate, impressed above; veinlet reticulation impressed above; inflorescence spicate, the spikes head-like, about 1.5 cm. long and to 2 cm. wide, axillary, binary; peduncles slender, about 1.5 cm. long, glandular-villous and short-hirsute; bracts pale-green, submembranous, accrescent after anthesis, broadly ovate or rounded-ovate, acute or acuminate at the apex, very numerous, closely imbricate, densely pilose with short glanduliferous hairs and longer spreading eglandular ones; calyx very densely pilose with long white hairs; corolla hypocrateriform, yellow or yellowish during anthesis, later nearly white or "pale white with tinge of green", 6—7 mm. long, the tube very slender, glabrous outside, the lobes very short, densely white-hirtellous outside.

The type of this species was collected by Howard Scott Gentry (no. 3039) on a tolerant oak slope at Agrimincor, on the Río Mayo, Sonora, Mexico, on April 6, 1937, and is deposited in the herbarium of the Chicago Natural History Museum.

Standley (1937) states that the species is related to Aloysia barbata (T. S. Brandeg.) Moldenke, but this relationship is certainly not close nor obvious! Gentry (1942) states that it grows on "Rocky slopes and mesas in Oak Forest.....On the arid rocky slopes it forms a rather spindling shrub 1—2 m. high, but on the mesas with deeper and moister soils it may form a large bushy shrub 3—5 m. high. On a mesa near Algodones by Sierra Chacuro it plays locally a dominant part in the makeup of the cover. In general, however, it is rather widely scattered as individual shrubs. Flowers yellowish; spring and late summer. This shrub is not closely allied to Lippia barbata Brandeg. as suggested by Standley, nor is it to be confused with the tree Lippia Pringlei Briq. Though the flower structure of the latter and of L. Gentryi may be very similar, no close observer would take them for the same species in the field. It has recently been collected in northern Sinaloa, Puerto a Tamiapa." He also refers to it as a characteristic plant of the Oak Forest in canyons and on mountain slopes, but on the label of his no. 1385 he says "I found only a few plants in one locality."

Collectors have encountered the species on oak mesas, shady rocky slopes, steep sunny clay slopes in oak forests, and near the base of cliffs and talus slopes among pines and oaks. Hurd says "common in fairly dry locations" in Durango. It has been collected in anthesis and fruit in March and April, at altitudes of 2800 to 6210 feet. Material has been misidentified and distributed in herbaria as L. pringlei Briq. and L. umbellata Cav. On the other hand, the H. S. Gentry 2037, distributed as L. gentryi, is actually L. pringlei.

In all, 28 herbarium specimens, including material of the type collection, and 2 mounted photographs have been examined by me.

Citations: MEXICO: Durango: J. Gonzalez Ortega 5373 (Me, W—1207504); R. P. Hurd 67 (Mi). Sinaloa: H. S. Gentry 5834 (Ak—

20456, Du--274085, Fs, G, Me, Me, Mi, N); I. L. Wiggins 13187 (Du--404629). Sonora: H. S. Gentry 1385 (A, Ca--646345, Fs, Ge, I, Me, Me, Mi, S), 3039 (A--isotype, Ca--582074--isotype, Fs--isotype, Ge--isotype, Me--isotype, Me--isotype, N--photo of isotype, S--isotype, Z--photo of isotype).

LIPPIA GLANDULOSA Schau. in A. DC., Prodr. 11: 577. 1847.

Synonymy: Lippia microphylla var. alpestris Beyrich ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia glandusoa Schau. ex Rennó, Levant. Herb. Inst. Agron. Minas 150, sphalm. 1960.

Bibliography: Schau. in A. DC., Prodr. 11: 577. 1847; Schau. in Mart., Fl. Bras. 9: 227 & 228. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 14. 1947; Moldenke, Castanea 13: 116. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 689, 725, & 824 (1949) and 4: 1132, 1167, & 1175. 1949; Moldenke, Résumé 93, 314, & 461. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 3: 33 (1962) and 11: 4. 1964; Moldenke, Phytologia 12: 23 & 47. 1965.

Shrub, 0.5--2.5 m. tall, much branched; branches and branchlets fuscous, tetragonal, pubescent-hirtellous, pulverulent-glandulose when young, the bark eventually shreddy, the terminal branchlets slender, virgate, floriferous; leaves small, decussate-opposite, petiolate, becoming smaller upwards; leaf-blades ovate or oblong, about 1.2 cm. long and 6 mm. wide, obtuse or acuminate in outline at the apex, but subacute at the apex itself, pinnerved, crenate along the margins, conspicuously rugose, sparsely pubescent above with eglandular hairs, foveolate and canescent-tomentose beneath, more hirtellous on the venation, subfarinose with shiny resinous glands, the immature ones subhirtellous throughout, the mature ones pubescent only on the venation, the pubescence finally wearing off from the upper surface, not scabrous; secondaries 8 per side; peduncles binary or ternate, surpassing the subtending leaves, filiform, about 8 mm. long, pubescent; heads tetraquetrous-ovoid or subglobose-ovoid; bractlets pale or yellowish, not blackening in drying, carinate, decussate-tetraquetrous, ovate, about 4 mm. long or finally more elongate, acuminate at the apex, imbricate, equaling the corolla-tube, the apex folded and subrecurved, the margins and keel villous; calyx about 1 mm. long or slightly longer, closely investing the base of the corolla-tube, bifid, villous-pubescent; corolla hypocrateriform, white or whitish to white-cream or yellowish, not blackening in drying, its tube about 3 mm. long, straight, ventricose at the middle, glandular-pubescent on the outside above the middle, the limb small, concave, glandular-puberulent on the back, the lobes rounded, retuse at the apex, crisped; stamens didynamous, included; style filiform, smooth, almost equaling the corolla-tube; stigma unilateral at the apex.

This species was based by Schauer on J. E. Pohl 132 and s.n. from Rio Paracatu and on L. Riedel s.n. from Morro de São Jeronimo in the Serra de Chapada, Minas Gerais, Brazil, deposited in the Vienna and Leningrad herbaria. A duplicate cotype of the first-mentioned collections in the herbarium of the Botanisches Museum in Berlin was photographed by Macbride as his type photograph no. 17508, but is now destroyed. Schauer (1847) places the species in his Section Goniostachyum and says of it "Habitu L. microphyllae Cham. similis sed foliorum figura et indumento, glandulis copiosis resinosis bracteis et corolla flavescente nec siccando nigrescente, distincta."

The type of L. microphylla var. alpestris was collected by Heinrich Carl Beyrich in the Serra dos Orgaos, Rio de Janeiro, Brazil, in 1833, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm.

The species has been found in woods, on campos, and on manganese outcrops, at 1100 to 1200 meters altitude, flowering from October to February and in April and May. Material has been misidentified and distributed in herbaria as L. microphylla Cham., L. origanoides H.B.K., L. sidoides Cham., and Hyptis sp. It is closely related to the three species just mentioned, as well as to L. graveolens H.B.K., L. affinis Schau., L. dumetorum Herzog, L. elegans Cham., L. gracilis Schau., L. grata Schau., L. hickenii Troncoso, L. laxibracteata Herzog, L. martiana Schau., L. mattogrossensis Moldenke, L. obscura Briq., L. pendula Rusby, L. rubiginosa Schau., L. salviaefolia Cham., L. schomburgkiana Schau., L. stachyoides Cham., and L. velutina Schau. -- a group of very closely related species which is badly in need of more intensive study.

The Löfgren s.n. [Picos dos Marins, Jan. 10, 1897], Herb. Com. Geogr. & Geol. S. Paulo 3495, and Herb. Inst. Bot. S. Paulo 15659, distributed as L. glandulosa, are L. iodophylla Schau.

In all, 23 herbarium specimens of L. glandulosa, including type material of all the names involved, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Minas Gerais: Assis 8 (G, N); A. P. Duarte 7849 [Herb. Bradeanum 27898] (N); A. Lutz 1690 (Z); Mello Barreto 3209 [Herb. Jard. Bot. Belo Horiz. 2048] (N); Mendes Magalhães 1361 (Be--14569), 1699 (Be--14559), 1742 [Herb. Jard. Bot. Belo Horiz. 41453] (N), 1887 (Be--14706), 17193 (S); Murça Pires & Black 2838 (W--2221531); J. E. Pohl 132 [Macbride photos 17508] (It--photo of cotype, Kr--photo of cotype, N--photo of cotype, W--photo of cotype), s.n. (Br--cotype); Schwacke s.n. [Herb. Mus. Rio Jan. 14886] (W--1199729); L. O. Williams 5503 (G, N, S), 8135 (G, N). Rio de Janeiro: Beyrich s.n. [Serra dos Orgaos, 1833] (S); Glaziou 14155 (N); Santos Lima 324 [Herb. Jard. Bot. Rio Jan. 27072] (N); Santos Lima & Brade 14290 [Herb. Jard. Bot. Rio Jan.

29539] (B). State undetermined: Mello Barreto 2049 [Parque Vera Cruz] (N).

LIPPIA GLAZIOVIANA Loes. ex Glaz., Bull. Soc. Bot. France 58, Mém. 3: 540, hyponym. 1911.

Bibliography: Glaz., Bull. Soc. Bot. France 58, Mém. 3: 540. 1911; Prain, Ind. Kew. Suppl. 5: 153. 1921; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 238. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 61. 1948; Moldenke, Alph. List Cit. 3: 689. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93 & 461. 1959.

Dwarf pleasantly fragrant shrublet; stems apparently simple, unbranched, strict, virgate, slender, erect, obtusely tetragonal, rather densely and uniformly pubescent with short brownish hairs standing at right angles to the stem; nodes not annulate; principal internodes 0.8—2 cm. long; leaves decussate-opposite or the lowest only alternate-approximate, rather numerous, sessile, thick-textured and firm, erect, often not patent, ovate, 0.6—1 cm. long, 5—7 mm. wide, obtuse or subacute at the apex, regularly crenulate along the whole margins with very low shallow teeth, rounded to truncate or subcordate at the base, usually 5-plinerved, rather densely short-pubescent on both surfaces, more densely so beneath, scabridulous and rugulose above, the hairs spreading and brownish, eglandular; midrib and secondaries very slender, plane or slightly impressed above, slightly prominulous beneath, the secondaries ascending, the veinlet reticulation very fine, subimpressed above and rather conspicuously prominulous beneath, terminating in the marginal teeth; inflorescence terminal or crowded in the uppermost leaf-axils, small; spikes subsessile or very short-pedunculate, subglobose or sometimes short-cylindric, to 1.5 cm. long, about 1 cm. wide, many-flowered; bractlets large, imbricate, membranous, surpassing the flowers, conspicuously venose, conspicuously pubescent; corolla hypocrateriform, rose-colored.

This species was based by Loesener on two collections made by Auguste François Marie Glaziou -- in whose honor it was named -- in Brazil -- the first, no. 19170, collected among rocks at Biribiry near Diamantina, Minas Gerais, and the second, no. 21918, at Serra dos Veadeiros, Goías, deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris. A specimen of the second-mentioned collection was photographed by Macbride in the herbarium of the Botanisches Museum at Berlin as his type photograph no. 17509, but is now destroyed.

Loesener's original description, while very fragmentary, seems to me to be adequate under the International Rules of Botanic Nomenclature to validate the name: "Frutescent, fl. roses. Janvier--février. Plante à très bonne odeur. CC." Glaziou indicates that duplicates of the original collections were deposited in the herbaria at Paris, Berlin, Kew, Brussels, and elsewhere.

In all, 2 herbarium specimens and 8 mounted photographs of the

cotype material have been examined by me.

Citations: BRAZIL: Goías: Glaziou 21918 [Macbride photos 17509] (Br--cotype, F--photo of cotype, It--photo of cotype, Kr--photo of cotype, N--photo of cotype, N--photo of cotype, N--cotype, Si--photo of cotype, W--photo of cotype, Z—photo of cotype).

LIPPIA GOSSWEILERI S. Moore, Journ. Bot. 57: 247. 1919.

Bibliography: S. Moore, Journ. Bot. 57: 247. 1919; A. W. Hill, Ind. Kew. Suppl. 6: 117. 1926; Good, Journ. Bot. 68, Suppl. 2: 139. 1930; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 51 & 95. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 62. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 119 & 190. 1949; Moldenke, Résumé 147 & 461. 1959.

Erect branched shrublet; branches leafy, pubescent; leaves decussate-opposite, sessile, oblong or oblong-obovate, about 2 cm. long and 7 mm. wide, gray in drying, obtuse at the apex, denticulate along the margins or subentire, firmly membranous, scabridous above, pubescent beneath; inflorescence long-pedunculate; peduncles ascending-patulous, about 5 cm. long, pubescent; spikes many-flowered, obovoid or subglobose, 1—1.5 cm. long, about 1 cm. wide; bractlets lanceolate, surpassing the flowers, acute at the apex, pubescent on both surfaces, about 1 cm. long when mature; calyx about 1.5 mm. long, deeply bilobed, white-sericeous, the lobes broadly ovate, emarginate at the apex; corolla hypocrateriform, white, its tube about 3 mm. long, puberulent on the outer surface, about 0.3 mm. wide at the base, ampliate to 1 mm. above, the lobes shorter than the tube, the anterior one about 1.25 mm. long and 2 mm. wide, the posterior one 1.25 mm. long and wide, and the lateral ones 0.5 mm. long and 0.8 mm. wide; stamens included; style about 1 mm. long, glabrous; stigma oblique, about 0.7 mm. long; ovary ovoid, about 0.75 mm. long, shorter than the style; nutlets about 1.25 mm. in diameter.

The type of this little-known species was collected by John Gossweiler (no. 3349) — in whose honor it was named -- in open thickets near Munonque, Angola. Moore (1919) states that it is "Easily told from L. Wilmsii H. H. W. Pears. by the entire leaves and the bracts; the calyx of the two yields another point of contrast."

Nothing is known to me of this species except what is stated in the literature.

LIPPIA GRACILIS Schau. in A. DC., Prodr. 11: 576—577. 1847.

Synonymy: Lippia salviaefolia var. parvifolia Mart. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941. Lippia parviflora Gardner ex Moldenke, Alph. List Invalid Names Suppl. 1: 15, in syn. 1947 [not L. parviflora Sessé & Moc., 1940].

Bibliography: Schau. in A. DC., Prodr. 11: 576—577. 1847; Schau. in Mart., Fl. Bras. 9: 226—227. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Luetzelburg, Estud. Bot. Nordéste 3: 224. 1923; Moldenke, Suppl. List Invalid Names 6. 1941;

Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Alph. List Cit. 1: 223. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 15. 1947; Moldenke, Castanea 13: 116. 1948; Moldenke, Alph. List Cit. 2: 485 (1948), 3: 691, 695, 712, & 770 (1949), and 4: 1203. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Phytologia 3: 287. 1950; Moldenke, Résumé 93, 220, 316, 317, & 461. 1959; Moldenke, Résumé Suppl. 11: 4. 1964; Moldenke, Phytologia 12: 23 & 47. 1965.

Shrub, to 2 m. tall, with a pleasant aroma almost like that of thyme (Thymus); branchlets slender, tetragonal, sulcate, pubescent-tomentose; leaves small, very variable in size, decussate-opposite, petiolate; petioles more than one-third as long as the blades; leaf-blades thin, ovate or oval to obtuse, 0.6--1.6 cm. long, 3--10 mm. wide, acute or obtuse at the apex, penninerved, crenate along the margins, rounded at the base and contracted into the petiole, conspicuously venose-reticulate and rugose, green and finely velutinous above, paler and glandular-punctate beneath as well as very lightly tomentose, becoming rufescent; peduncles axillary, numerous, 2 or 4 per axil, weak, shorter than the subtending leaves; heads tetraquetrous-ovoid or -oblong; bractlets membranous, ovate, imbricate, subacute at the apex, connate at the base, very slightly puberulent and finely glandulose, the margins and keel white-villous; flowers aromatic; corolla small, hypocrateriform, white; stamens yellow.

Schauer (1847) places this species in his Section Goniostachyum. He bases it on a collection made by Carl Friedrich Philipp von Martius in hedges between fields at Joazeiro, Bahia, Brazil, deposited in the Martius Herbarium at the Botanischer Staatsammlung in Munich, where Macbride photographed it as his type photograph no. 20325. He says of the bractlets: "tergo quatenus ad inferioribus tegentur albo-villosae". The plant has been found on campos and "terra firma", flowering in April. A vernacular name recorded for it is "herva de marajó".

Gardner's L. parviflora was based on his no. 2289, collected somewhere in Piauí, Brazil, and deposited in the herbarium of the Naturhistorisches Museum at Vienna, where it was photographed by Macbride as his type photograph no. 34327. The L. parviflora of Sessé & Mociño belongs in the synonymy of L. umbellata Cav.

In all, 9 herbarium specimens of L. gracilis and 6 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: BRAZIL: Amazonas: Herb. Inst. Nac. Pesq. Amaz. 1035 (Ok); Herb. Jard. Bot. Rio Jan. proc. no. III [Pirarara] (Ja). Bahia: A. Lutz 113 (Z); Martius s.n. [Macbride photos 20325] (Kr--photo of type, N--photo of type, W--photo of type). Minas Gerais: P. Clausen 618 (S). Piauí: G. Gardner 2289 [Macbride photos 34327] (It--photo, Kr--photo, M, N, N--photo); N. Netto 67 (Ja--14892). CULTIVATED: Brazil: Chagas s.n. [Herb. Inst. Nac. Pesq. Amaz. 1978] (Ok), s.n. [Herb. Inst. Nac. Pesq. Amaz. 3959] (Ok).

LIPPIA GRANDIFLORA Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 591. 1847.

Synonymy: Lippia grandiflora Mart. ex Schau. in Mart., Fl. Bras. 9: 247. 1851.

Bibliography: Schau. in A. DC., Prodr. 11: 591. 1847; Schau. in Mart., Fl. Bras. 9: 247. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Luetzelburg, Estud. Bot. Nordéste 3: 224. 1923; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 691 & 710. 1949; Moldenke, Revist. Sudam. Bot. 8: 167. 1950; Moldenke, Résumé 93 & 461. 1959; Moldenke, Résumé Suppl. 8: 2 & 4. 1964; Moldenke, Phytologia 12: 24. 1965.

Dwarf subshrub; roots thick, tuberculate; stems issuing from a woody xylopodium, about 30 cm. long, erect, fruticose, weak; branches tetragonal, hirtous; floriferous branchlets issuing from the lowest nodes of the stem; leaves decussate-opposite, very short-petiolate; leaf-blades lanceolate-oblong, acute at the apex, crenate-serrate toward the apex, entire toward the base, 3-plinerved, pinnately veined, the young-ones villous-hirsute above, pubescent beneath and strigose-hirsute on the venation; peduncles axillary, solitary, elongate, villous; heads compact at the start of anthesis, later more elongate, finally loosely racemose or subracemose; rachis villous; bractlets alternate, membranous, ovate, concave or almost folded, acuminate at the apex, shorter than the corolla-tube, 3-nerved, imbricate or eventually spreading, hiding the calyx, villous on the back; pedicels very short; calyx very short, very densely short-villous, shortly bifid, obsoletely 4-dentate; corolla very large for the genus, rose-color, with a yellow throat, pubescent outside, the tube about 1 cm. long, obliquely ventricose below the middle, the limb wide, about 1 cm. in diameter, the upper lip rounded, the lower lip with its middle lobe broadest, transversely elliptic, and the lateral ones broadly ovate and obtuse.

The type of this species was collected by Carl Friedrich Philipp von Martius (no. 157) in fields near Contendas, Minas Gerais, Brazil, is a very immature specimen, and is deposited in the Martius Herbarium at the Botanisches Museum in Munich, where it was photographed by Macbride as his type photograph no. 20326. Schauer (1847) places the species in his Section Zapania, Subsection Corymbosae. He comments (1851): "Species ad typum L. lasiocalycinae condita, a qua differt villositate totius plantae, bracteis et corolla pro genera permagna."

Material has been misidentified and distributed in herbaria under the name Lantana sellowiana Link & Otto. Luetzelburg (1923) records the species from the Serra do Benedicto, Bahia, and from Campinas de Duro, Goías.

In all, 5 herbarium specimens and 4 mounted photographs, including phototypes of both names involved, have been examined by me.

Citations: BRAZIL: Goías: Macedo 3694 (S, W--2059795). Minas Gerais: Heringer 3506 (Z); Martius 1571 [Macbride photos 20326]

(It--photo of type, Kr--photo of type, N--photo of type, W--photo of type); Saint-Hilaire s.n. (N). State undetermined: Glaziou 21892, in part (Br).

LIPPIA GRANDIFOLIA Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 167--168. 1851.

Synonymy: Lippia adoensis R. E. Fr. apud Robyns, Fl. Sperm. Parc Nat. Albert 2: 138, in syn. 1947 [not L. adoensis Hochst., 1845, nor L. adoënsis Hochst., 1841]. Lippia adoënsis Auct. ex Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 791, in syn. 1962.

Bibliography: Walp., Repert. Bot. Syst. 4: 55. 1845; A. Rich., Tent. Fl. Abyss. 2: 167--168. 1851; Aschers. in G. Schweinf., Beitr. Fl. Aethiop. 278. 1867; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 45, 49, & 95. 1942; Moldenke, Alph. List Cit. 1: 98. 1946; Robyns, Fl. Sperm. Parc Nat. Albert 2: 138--139 & 616. 1947; Moldenke, Phytologia 2: 340. 1947; Moldenke, Alph. List Cit. 2: 572, 601, 604, 640, & 644 (1948), 3: 685, 723, 894, 901, & 917 (1949), and 4: 1032, 1084, 1174, 1177, 1182, 1202, 1218, 1220, 1248, & 1298. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Moldenke, Phytologia 3: 136. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 109, 110, 115, 116, & 190. 1949; Moldenke, Résumé 134, 135, 142, 143, 310, & 461. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 791. 1962; Moldenke, Résumé Suppl. 3: 16 (1962) and 11: 7. 1964; Moldenke, Phytologia 12: 41 & 42. 1965.

Polymorphic perennial suffruticose herb, shrub, or subshrub, 0.5--3.2 m. tall, erect, hispid; rhizomes heavy; stems thick, erect, strict, obtusely hexagonal, tuberculate-hispid; leaves decussate-opposite or verticillate in 3's or 4's, scarcely petiolate, slightly aromatic, the blades oval-oblong or elliptic-oblong to lanceolate, acute at the apex, dentate-serrate or coarsely serrate along the margins except at the base, gradually attenuate to the base, scabrous and bullate above, pubescent-tomentose beneath, rough and hispid on both surfaces, the uppermost much smaller; inflorescence rather long-pedunculate, axillary, 1--4 in each upper leaf-axil, not developed in terminal cymes but in an elongate naked slender and distant-flowered raceme; heads globose to globose-ovoid or cylindric, very short-pedunculate; bractlets oval or oval-oblong, long-acuminate at the apex, imbricate, equaling or almost equaling the corolla; flowers small; calyx green, compressed laterally, hirsute or lanate, half as long as the corolla, the hairs forming 2 lateral bands; corolla hypocrateriform, varying from white or greenish-white to whitish-yellow, yellowish, yellow, bright-yellow, sulphur-yellow, pale yellowish-cream, or cream, sometimes described as white with a yellow throat or even pale-mauve [Mullenders 601]; filaments pale-greenish; anthers cream; style pale-greenish.

This species was based by Richard on a collection made by Richard Quartin-Dillon near Adoua, Ethiopia, and one made by Georg Heinrich Wilhelm Schimper (no. 734) on the mountainsides adjacent

to the deep valley of Feurfeura. Schauer (1847) and Schumann (1902) both reduce this species to synonymy under L. adoënsis Hochst., of which the type is Schimper 1079. Richard (1851), however, describes L. grandifolia and comments about it as follows: "L. ramis strictis, rectis obtuse hexagonis bipedalibus tuberculato-hispidis; foliis ternis basi vix petiolatis elliptico-oblongis aut lanceolatis acutis, basi sensim attenuatis, margine grosse serratis, utrinque hispidis, asperis; capitulis globosis brevissime pedunculatis, in axilla foliorum superiorum minimorum solitariis aut binis et inde racemum elongatum nudum gracilem distantiflorum constituentibus; bracteis ovali-oblongis longe acuminatis undique imbricatis, flores aequantibus; calice compresso lanato, corolla dimidio breviore. Crescit circa Adoua (Quartin Dillon) et ad latera montium versus vallem profundam Feurfeura, mense Octobre florens (Schimper). Observation: Je ne partage pas l'opinion de M. Schauer....qui réunit cette espèce à la précédente [L. adoensis]. Elle en est distincte par des caractères estrêmement tranchés. Ainsi ses feuilles plus longues et plus larges et à dentes écartées, ne sont pas gaufrées; elle sont couvertes de poils hispides, ainsi que la tige; les capitules sont portés sur des pédoncules très-courts et ordinairement solitaires à l'aisselle des feuilles supérieures réduites à de très-petites dimensions; le calice est très-comprimé et tout couvert de poils lanugineux, très-longs; le tube de la corolle est proportionnellement beaucoup plus court que dans l'espèce précédente."

The species has been collected on previously cleared land allowed to go back to bush, on tree savannas and thorny savannas, savannas with Acacia, on dry hills covered with herbs, and on grassy hillsides with scattered shrubs and shrub thickets subject to burning, at altitudes of 650 to 1900 meters, flowering from September to July, and fruiting from December to February, May, June, and September. Myers found it occasional among coarse grasses in neglected clearings; Hauman calls it abundant, while Fries describes it as "arbuste atteignent la hauteur d'un homme". Germain says "suffrutex érigé de 50 cm. de haut, petites fleurs vertes en chatons; stigmate trifide." Chapin notes "flowers small and white in heads that look mostly green". Robyns (1947) reports "se rencontrant dans les régions de savanes du Congo Belge oriental et du Moyen-Katanga. En dehors du Congo Belge, elle semble confinée a l'Abyssinie et à l'Afrique tropicale centrale et orientale."

The L. adoensis of Hochstetter is a synonym of L. abyssinica (Otto & Dietr.) Cuf. Cufodontis (1962) includes a "L. adoënsis.. Baker 1900 in part" in the synonymy of L. grandifolia. The Drummond & Hemsley 4496 collection, cited below, is labeled "sp. nov."

Vernacular names recorded for the species are "akuetria", "bulamurima", "dianga-bilondo", "djanga-malondo", "mogira-ronda", "onga-ai", "umzirarondwe", and "wakayo". Material has been misidentified and distributed in herbaria under the names L. adoen-

sis Hochst., L. radula J. G. Baker, Lantana salvifolia Jacq., L. trifolia L., and Labiatae.

In all, 66 herbarium specimens, including type material of all the names involved, and 3 mounted photographs have been examined by me.

Citations: SUDAN: Mongalla: J. G. Myers 7731 (K); N. D. Simpson 7333 (K). ETHIOPIA: Schimper II.734 (F--photo of isotype, M-isotype, N--photo of isotype, S--isotype, Si--photo of isotype, Z--photo of isotype). CONGO LEOPOLDVILLE: Bequaert 3296 (Br); Besquiere 5930 (S); Blommaert 185 (Br); Brédo 1307 (Br), 1400 (Br), 1470 (Br), 1555 (Br), 1914 (Br); Chapin 237 (N); Claessens 83 (Br), 1737 (Br, N); Debraene 182 (Br); Dewevre 758 (Br); De Witte 1651 (Br); Germain 508 (Br, Br); Ghesquière 4288 (Br), 5930 (Br); Hauman 238 (Br); Hendrickx 30 (Br); Humbert 8182 (B, Br); Jurion 39 (Br), 199 (B, Br), 224 (Br); Kassner 2261.6 (Br); Lebrun 3504 (Br), 3678 (Br), 4588 (Br); Lejeune 3 (Br); Luxen 358 (B, Br), 543 (Br); W. Mullenders 596 (Br, Br, Br, N), 601 (Br); Quarré 2427 (Br, N), 2459 (Br, N), 2738 (Br), 2846 (Br, N), 2899 (Br, N); Robyns 2267 (Br, Br); Sapin s.n. [Juin 1908] (Br); Scops 128 (Br); Van Gruderbeek s.n. [Uele] (Br). RUANDA & URUNDI: Troupin 6638 (N), 7987 (N). UGANDA: E. Brown 84 (K); F. Chandler 12 (K); Chapin 80 (N); Drummond & Hemsley 4496 (S); Dümmer 54 (W--633991); Mearns 2418 (W--632391).

LIPPIA GRANDIFOLIA var. ANGUSTISPICATA Moldenke, Phytologia 3: 419--420. 1951.

Bibliography: Moldenke, Phytologia 3: 419--420 & 456. 1951; Moldenke, Biol. Abstr. 25: 3051. 1951; Moldenke, Résumé 142 & 461. 1959.

This variety differs from the typical form of the species in having the spikes 2--3 cm. long and about 7 mm. wide throughout, regularly quadrangular-cylindric, very densely many-flowered, with very closely imbricate bractlets, the peduncles much abbreviated, 5 mm. long or less, the bractlets ovate, 4--5 mm. long, keeled on the back, shortly attenuate-subacuminate or acute at the apex, canescent-strigillose on the back. It is a shrub, 1--1.5 m. tall, with cream-yellow flowers.

The type of the variety was collected by Van der Gucht (no. 364) in the Republic of Congo in 1912 and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. It is known thus far only from the original collection. Two herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: CONGO LEOPOLDVILLE: Van der Gucht 364 (Br--type, N--isotype, N--photo of type, Z--photo of type).

LIPPIA GRANDIFOLIA var. LONGIPEDUNCULATA Moldenke, Phytologia 3: 271. 1950.

Bibliography: Moldenke, Phytologia 3: 271 (1950) and 3: 456. 1951; Moldenke, Résumé 142, 183, & 461. 1959.

This variety differs from the typical form of the species in having its peduncles regularly up to 4 cm. long. It attains a height of 4 feet and has white flowers.

The type of the variety was collected by Richard Arnold Dümmer (no. 54) in elephant grassland, at 4000 feet elevation, at Kepayo, Uganda, between July and September, 1914, and is deposited in the herbarium of the Royal Botanic Gardens at Kew.

In all, 3 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: CONGO LEOPOLDVILLE: Menager 25 (Br). UGANDA: Dümmer 54 (F--photo of type, K--type, N--isotype, N--photo of type, Sg--photo of type, Z--photo of type).

LIPPIA GRATA Schau. in A. DC., Prodr. 11: 576. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 576. 1847; Schau. in Mart., Fl. Bras. 9: 225--226. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 691 & 712 (1949) and 4: 1176. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Phytologia 12: 23. 1965.

Shrub, with the young parts sericeous-hirsutulous; branchlets numerous, slender, strict, spreading, pubescent; leaves decussate-opposite, petiolate; leaf-blades ovate, about 2.5 cm. long and 1.7 cm. wide on the lower branches, decreasing in size upwards, always surpassing the inflorescences, subacute at the apex, crenate along the margins, rounded or subcordate at the base, 5-plinerved, rugulose, densely velutinous above, appressed-tomentose and incanous beneath and densely covered with very minute sessile glands, visible only when the pubescence wears off, rufescent in drying, exuding an aromatic oil, the hairs themselves eglandular; peduncles axillary, aggregate, flaccid, about 6 mm. long, about 4 mm. longer than the heads at the start of anthesis, densely covered with very minute sessile glands, shorter than the subtending leaves; heads tetraquetrous-ovoid; bractlets herbaceous, ovate, imbricate, acute at the apex, connate at the base, incanous-subvillous or villous-subhirsute over the entire surface, but especially on the keel and margins, densely covered with very minute sessile glands, shorter than the corolla-tube; calyx oblong, very shortly 4-dentate, pubescent; corolla hypocrateriform, its tube straight, about 4 mm. long, the upper part surpassing the bractlets, ventricose and pubescent at the middle, the limb nigrescent in drying, the lower lobe subquadrate, retuse and mucronate.

The type of this species was collected by Carl Friedrich Philipp von Martius in pastures and hedgerows at Villa Nova da Rainha, Bahia, Brazil, and is deposited in the Martius Herbarium at the Botanisches Museum in Munich, where it was photographed by Macbride as his type photograph no. 20327. Schauer (1847) places the species in his Section Goniostachyum. He describes the leaf-pubescence as "pube plane relatis deinceps magis conspicuis odore grato

pollentia" and says "Species indumento dense velutino glandulis copiosissimis interstincto et bracteis omnibus per paria connatis ad affinibus eximie distincta."

It has been collected in anthesis in March. Material has been misidentified and distributed in herbaria under the name L. salviaefolia Cham. & Schl. In all, 1 herbarium specimen and 5 mounted photographs have been examined by me.

Citations: BRAZIL: Bahia: Blanchet 3886 (Br); Martius s.n. [Villa Nova da Rainho; Macbride photos 20327] (It--photo of type, Kr--photo of type, N--photo of type, N--photo of type, W--photo of type).

LIPPIA GRAVEOLENS H.B.K., Nov. Gen. & Sp. Pl., ed. fol. pict. 2: 215--216 (1817), ed. quart., 2: 266--267. 1818.

Synonymy: Lippia graveolens Humb. ex Spreng. in L., Syst. Veg., ed. 16, 2: 752. 1825. Lippia graveolens Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 54. 1840. Lantana origanoides Mart. & Gal., Bull. Acad. Brux. 11 (2): 327. 1844. Lippia graveolens Kunth ex Schau. in A. DC., Prodr. 11: 575. 1847. Lippia berlandieri Schau. in A. DC., Prodr. 11: 575--576. 1847. Lippia berlandieri Torr. apud Coult., Contrib. U. S. Nat. Herb. 2: 328, in syn. 1894. Goniostachyum graveolens (H.B.K.) Small, Fl. Southeast. U. S., ed. 1, 1012 & 1337. 1903. Lippia berlandieri Millsp. apud P. C. Standl., Field Mus. Publ. Bot. 3: 402, in syn. 1930. Lantana odorata Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 29, in syn. 1940 [not L. odorata Ait., 1847, nor L., 1767, nor Weigelt, 1832]. Lippia tomentosa Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 32, in syn. 1940. Goniostachyum berlandieri (Schau.) Tharp ex Moldenke, Suppl. List Invalid Names 3, in syn. 1941. Lippia amentacea M. E. Jones ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941. Lippia suaveolens H. B.K. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941. Hippia graveolens H.B.K. ex Moldenke, Alph. List Invalid Names Suppl. 1: 10, in syn. 1947. Lantana graveolens H.B.K. ex Moldenke, Résumé Suppl. 3: 32, in syn. 1962. Lippia geminata Schl. ex Moldenke, Résumé Suppl. 11: 7, in syn. 1964 [not L. geminata H.B.K., 1818, nor Humb. & Bonpl., 1841, nor Humb. & Kunth, 1846, nor Kunth, 1825, nor Millsp., 1930].

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2: 95. 1894; Millsp., Field Mus. Publ. Bot. 1: 42 (1895) and 1: 316--317. 1896; Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898; Rose, Contrib. U. S. Nat. Herb. 5: 227. 1899; T. S. Brandeg., Zoe 5: 219. 1900; Millsp., Field Mus. Publ. Bot. 2: 91. 1900; J. K. Small, Fl. Southeast. U. S., ed. 1, 1012 & 1337. 1903; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1156. 1904; Millsp. & Loes. in Engl., Bot. Jahrb. 36: Beibl. 80: 25. 1905; G. F. Gaumer, Cat. Terap. & List Prec. 21. 1907; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541. 1911; Rio de la Loza, Bol. Cienc. Med. 3: 21—25. 1912; J. K. Small, Fl. Southeast. U. S., ed. 2, 1012. 1913; M. Martínez, Cat. Alfabet. Nomb. Vulg. & Cientif. Pl. Mex., [ed. 1]. 1923; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1244-1246. 1924; P. C. Standl., Field Mus. Publ. Bot. 3: 402. 1930; M. Martínez, Cat. Nomb. Vulg. & Cientif. Pl. Mex., [ed. 2], 339. 1937; C. L. Lundell, Carnegie Inst. Wash. Publ. 478: 109 & 183. 1937; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; O. E. Sperry, Sul Ross State Teach. Coll. Bull. 19: 68. 1938; P. C. Standl., Field Mus. Publ. Bot. 18: 1008--1009. 1938; Moldenke, Alph. List Common Names 14 & 23. 1939; Moldenke, Carnegie Inst. Wash. Publ. 522: 164, 166--167, & 219—222. 1940; Moldenke, Suppl. List Common Names 16, 21, 22, & 24. 1940; Moldenke, Prelim. Alph. List Invalid Names 26, 29, 30, & 32. 1940; O. E. Sperry, Sul Ross State Teach. Coll. Bull. 22: 41. 1941; Calderón & Standl., Fl. Salvad., ed. 2, 237. 1941; Moldenke, Suppl. List Invalid Names 3 & 6. 1941; H. S. Gentry, Carnegie Inst. Wash. Publ. 527: 223 & 306. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 53--55. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 12, 14, 17, 20, 22, 23, & 95. 1942; Moldenke, Alph. List Invalid Names 25, 28--30, & 32. 1942; Moldenke, Phytologia 2: 74, 85, 88, 107, & 125 (1945) and 2: 156. 1946; Moldenke, Alph. List Cit. 1: 4, 23, 38, 111, 125--127, 148, 152, 176, 203, 216, 218, 227--229, 250, 251, 255, 266, 299, 300, & 307. 1946; Reko, Bol. Soc. Bot. Mex. 5: 26 & 29. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 10, 13, & 14. 1947; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 42--44. 1947; Moldenke, Phytologia 2: 330, 331, 347, & 384. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 50. 1948; Moldenke, Wrightia 1: 237—238. 1948; Miranda, Anal. Inst. Biol. Mex. 19 (2): 344. 1948; Moldenke, Alph. List Cit. 2: 335, 351, 370, 371, 393, 403, 468, 470, 474, 475, 477, 494, 520, 527, 538, 540--542, 587, 592, 594—596, 598, & 607 (1948), 3: 656, 658, 680, 681, 683, 695, 708, 709, 738, 752, 765, 769, 773, 785, 787, 798—800, 809, 810, 817, 828--830, 833, 871, 876, 878, 882, 907, 914, 919, 925, 932-934, 944, 948, 954, 961, 963, & 973 (1949), and 4: 990, 991, 1003, 1004, 1099, 1107--1109, 1121, 1126, 1143, 1148, 1159, 1174, 1182, 1186, 1187, 1213, 1228, 1236, 1239, 1245—1247, 1254, 1289, 1300, & 1303. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 22, 25, 31, 35, 38, 39, 162, & 190. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Langman, Select. Guide Mex. Flow. Pl. 453, mss. 1950; Moldenke, Phytologia 3: 375. 1950; Calpouzos, Econom. Bot. 8: 223--226, 228, 230, & 232, fig. 1 & 3. 1954; J. Rzedowski, Ciencia 15: 147 & 148. 1955; Moldenke, Inform. Mold. Set 51 Spec. 3. 1956; J. Rze-

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Illustrations: Calpouzos, Econom. Bot. 8: 223 & 225, fig. 1 & 3. 1954.

Suffrutescent very woody herb, erect branched shrub, or bushy and low slender aromatic shrub, usually 0.3--3 m. tall, or rarely a small tree to 9 m. tall (Standley), strong-scented with a sweet spicy fragrance like that of cinnamon (Cinnamomum zeylanicum), mint (Mentha), or thyme (Thymus); main stem quite woody, the bark peeling off in long longitudinal shreds, to 5 mm. in diameter; branchlets slender, tetragonal or subterete, strict, appressed-pubescent or villosulous, densely glandular-punctate, the pubescence sometimes spreading-pilose; petioles very slender, 2--20 mm. long, rather densely appressed-pubescent with mostly canescent hairs; leaves mostly small, fragrant with a cinnamon odor; leaf-blades chartaceous, oblong or ovate-oblong to elliptic, 1--6.5 cm. long, 0.5--3.5 cm. wide, usually obtuse or rounded (sometimes acute) at the apex, rounded or subcordate at the base, sometimes abruptly acute and slightly prolonged into the petiole, regularly crenate from the base to the apex with closely set blunt teeth, reticulate-rugose or subbullate above and rather densely strigose-hirsutulous with mostly appressed antrorse hairs, varying from puberulent and very conspicuously glandulose beneath to subvillous or tomentose with canescent hairs; peduncles axillary, 4--6 per node, spreading, usually equaling or slightly longer than the petioles, appressed-pubescent or strigose; spikes oblong, 4--12 mm. long; bractlets conspicuously 4-ranked, conduplicate-carinate, narrow-lanceolate, connate and imbricate at the base, usually wide-spreading or reflexed at the apex after anthesis, acute at the apex, not venose, glandulose, more or less densely hirsute-tomentose, the margins and keel usually more densely white-villous, about equaling the corolla-tube; flowers fragrant, mint-like, with a pleasant mint-odor; calyx to 2 mm. long, 2-lobed, 4-dentate, pubescent or subvillous; corolla yellow or yellowish to cream or white, sometimes described as white or creamy-white with a yellow eye or yellow throat or even cream-color changing to yellow in age, mostly turning brown in age, fragrant, hypocrateriform, its tube 3--6 mm. long, canescent-strigose on the outside.

The type of this well-known species was collected by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland on the seashore as Campeche, in the state of the same name, Mexico, and is probably deposited in the Bonpland herbarium at the Muséum National d'Histoire Naturelle at Paris. Schauer (1847) places the species in his Section Goniostachyum. L. amentacea is based on M. E. Jones s.n. from Laredo, Texas, deposited at Pomona College.

# BOOK REVIEW

Alma L. Moldenke

"Taxonomic Biochemistry and Serology", edited by Charles E. Leone, x + 728 pp., illustr. Ronald Press, New York 10, New York. 1964. $16.50

This book contains 47, mostly significant, papers presented at the International Conference on Taxonomic Biochemistry, Physiology, and Serology at the University of Kansas in 1962 as a first effort at gathering together information on molecular taxonomy to "serve as a beginning place for students and scholars who feel that the next great biological synthesis will be at the molecular level".

PART I : PRINCIPLES OF SYSTEMATICS

The old was shown by Arthur Cronquist to be an absorption of several new sets of principles — Linnean, deCandollean, Darwinian, Besseyan, cytogenetically enriched, populations centered, along with all present new forms which surely will not be the last, nor will they be the replacement for the basic classical work of the past and present.

So also claims Ernst Mayer who describes the new as different from the old mainly in viewpoint which is biological rather than nominalistic-topological. He stresses the use of ever increasing number of kinds of characters, a ready acceptance of new tools and techniques, further clarification of concepts as taxon vs. category, recognition of the subspecies as a category and not an evolutionary unit, and causes for similarities and differences among taxa. He reminds his readers that "we can never base classification on phylogeny (since we do not know it), but from our classification we can draw inferences on the relative probability of various possible phylogenies". Contrary to the Adansonian and Sneathean concept of "every feature is of equal weight in constructing natural taxa", Mayer states that he is "strongly inclined to a system of careful weighing. No electric computer has so far been able to surpass in the arrangement of higher categories the integrating power of the brain of an intelligent and experienced taxonomist". Rather than inductive "no weighing" and deductive "a priori weighing", he champions inductive-deductive "a posteriori weighing" which is basically the experienced scientific method. He concludes with a brief critique of numerical taxonomy, accepting the use of computers for efficiency, but emphasizing that their non-biological viewpoint intentionally rejects any "weighing" and is limited to the determination of phenetic distances between units and groups.

The future, predicted by Robert Sneath, will "include a more intensive study of evolutionary mechanisms, particularly population genetics, both under field conditions and in the laboratory under realistic assumptions." "Taxonomy of the higher categories

will be revised by some kind of numerical taxonomy." Development of objective machine methods for erecting taxonomies will remove many of the personal and subjective elements with consequent nomenclatural stability. Scientific names of organisms will have to be coded for information retrieval, causing the binomial system to become outdated by a monomial or numerical code one. In our great museums to the conventionally preserved material (to be increased rather than discarded, I hope) will have to be added specially preserved newer materials such as voice tapes or recordings, chromatography, etc., records, along with information storage and retrieval machinery. If this concept becomes modified in the Cain & Harrison manner of phyletic weighing or that of Mayer explained above it will be more acceptable to the functioning biosystematists of yesterday and today, and to their hopes for the future.

PART II : PERSPECTIVES IN MOLECULAR TAXONOMY

Marcel Florkin maintains that "the greatest virtue of a so-called natural system of taxonomy resides in the fact that classification based upon a few diagnostic characteristics of a species that place it in a given category, enables one to forecast the existence of a whole range of traits in individuals of the same species" and that "comparative biochemistry is adding chemical traits to this picture" at the level of protein macromolecules and on chains of effectors of proteinic nature. He demonstrates the differences between isology (chemical kinship) and homology (common origin) in reference to ATP which is isologous in all cells, but not always homologous as when it may be the product of the action of a chain of biocatalysts in glycolysis or differently of oxidative phosphorylation -- evidence of convergence at the molecular level.

Alan Boyden explains the value of systematic serology through precipitin testing with first homologous and later heterologous antigens, yielding a relative placement series which is especially useful in showing relationships in blood-containing animals. Bradley Scheer describes the role of comparative physiology in aiding systematists in producing an orderly arrangement of the myriad forms of life. Leaders in the bio-courier project explain the comparative immunobiological analyses for interplanetary exploration.

PART III : TAXONOMIC BIOCHEMISTRY OF PLANTS

Bell and Fowden show how restricted amino acids, etc., may establish or confirm a relationship between two or more groups of species -- as with canavanine showing degrees of relationship between subfamilies and tribes in the Leguminosae. The most promising results obtained so far have been at the level of the genus where it has been possible to subdivide the species of Lathyrus according to readily recognizable ninhydrin-positive patterns obtained after chromatography and ionophoresis of seed extracts. These results are in agreement with subdivisions made earlier on the basis of cytogenetic studies.

Alston and Turner discuss the problems of intraspecific by-

bridization in the comparative chemistry of Baptisia. By chromatography, etc. over 100 compounds disclosed 10 hybrids of eight species. Hybrids are morphologically intermediate between their parents, but chemically they represent the sum of their parents.

Mabry's work on the betacyanins, formerly thought to be nitrogenous anthocyanins, shows them to be red-violet chromo-alkaloids and limited to 9 or 10 families in the Centrospermae and closely allied orders.

Riley and Hopkins' chromatographic studies on the Rigidae and Retusae sections of the genus Haworthia gave different patterns on leaves from the same plant when treated at the same time.

Brehm and Alston, developing a biochemical profile on the genus Baptisia, established a pool of chemical constituents of B. leucophaea var. laevicaulis at different development stages, from different organs, and from different populations (limited to 100). Phenolic and other miscellaneous flourescent or ultraviolet absorbing compounds are by far the most practical for ready development of biochemical profiles, for population studies, and studies of genetic races and ecotype variations.

Moritz confirms the idea that serological characters tend to show evolutionary convergence.

Lester's double diffusion and immunoelectrophoresis of protein extracts of ten South American and twenty North American species of Solanum found the former all to have general uniformity of antigen and the latter to have two main antigens. By similar further testing 130 species of the genus seventeen series were found.

Fairbrothers and Johnson's precipitin test results on the Cornaceae and Nyssaceae show close agreement with present taxonomy.

PART V : COMPARATIVE BIOCHEMISTRY OF ANIMALS
PART VI : SEROLOGY OF ANIMALS
PART VII : MOLECULAR TAXONOMY OF MICROORGANISMS
PART VIII : TAXONOMIC ELECTROPHORESIS OF ANIMALS

Common problems and principles of classification, common biochemical pathways, common testing techniques, and equally outstanding authors make the papers in these sections valuable and interesting to botanists.

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# A NEW SPECIES OF BAUHINIA FOR THE FLORA OF SAO PAULO

Engº Agrº Nilza Fischer Mattos

BAUHINIA HERMESIANA N.Mattos sp. n. - Arbor aculeata circiter 10 m alta (ex collector). Ramuli terminales teretes pilis brevibus cinereis adpressis dense obtecti deinde castanescentes et minute lenticellosi. Folia alterna petiolis junioribus dense et breviter adpresso-cinereo-pilosis deinde glabrescentibus castanescentibus vel purpurascentibus, ad extremitatem paulo incrassatis et sulcatis, usque 3 cm longis, lamina usque 6,5 cm longa et 9,5 cm lata, fere coriacea, ambitu triangulari vel late triangulari, 9- palmatim nervata basi late truncata interdum leviter retusa, nervo marginali cincta, in medio vel paulo supra medium bilobata, lobis oblique triangularibus, apice retusis vel breviter obtuse acuminatis, supra nervo mediano interdum laxe piloso excepto glabra, viridi et nitidula, subtus flavo-viridescenti et opaca, ad nervos secundarios et nervulos laxe vel laxissime pilosa vel glabra, ad nervos primarios superne plusminusve pilosa basim versus praecipue in conjunctione dense rufescenti pilosa, nervis tribus centralibus rectis vel fere rectis reliquis arcuatis, supra prominulis et flavo-brunescentibus, subtus prominentibus. Racemi terminales breviter pedunculati dense adpresso-cinereo-pilosi, pluriflori. Alabastra elliptico-lanceolata, apice obtuso-apiculata. Flores pedicello cc. 12 mm longo dense minute fulvo-sericeo-piloso, plusminusve in medio vel paulo infra apicem bracteolis 2 alternis vel oppositis ovato-oblongatis basi incrassatis extus fulvo-sericeo-pilosis intus glabris 1,5 mm longis cito caducis intsructo, calice 1,2-1,7 cm longo, extus dense minute et adpresse fulvo-sericeo-piloso, intus glabro, inferne breviter stipitiformi attenuato, superne in dentes 4 inaequales triangulares irregulariter rumpenti, dente uno bidenticulato, petalis 5 vexillo flavescenti excepto albis, distincte brunneo-nervatis, extus pilis albis longis sparse obtectis, intus glabris, inferne in unguem longum angustatis, unguis 0,8-1,2 cm metientibus, laminis paulo inaequalibus, ambitu late obovatis usque obovato-rotundatis, maioribus 3,5 cm longis et 2,8-3,2 cm latis, minoribus 2,7-3,2 cm longis et 2,3-2,5 cm latis, staminibus 10 inaequilongis, maiore 4 cm minore cc. 2,7 cm longo, antheris linearibus 3,5-4,5 mm longis et 1,5 mm supra basim affixis, ovario oblongo dense subadpresse piloso 6 mm longo stipite 4-5 mm longo dense adpresso-piloso suffulto, stilo 9 mm longo inferne piloso.

Typus: Hermes M. de Souza s.n.

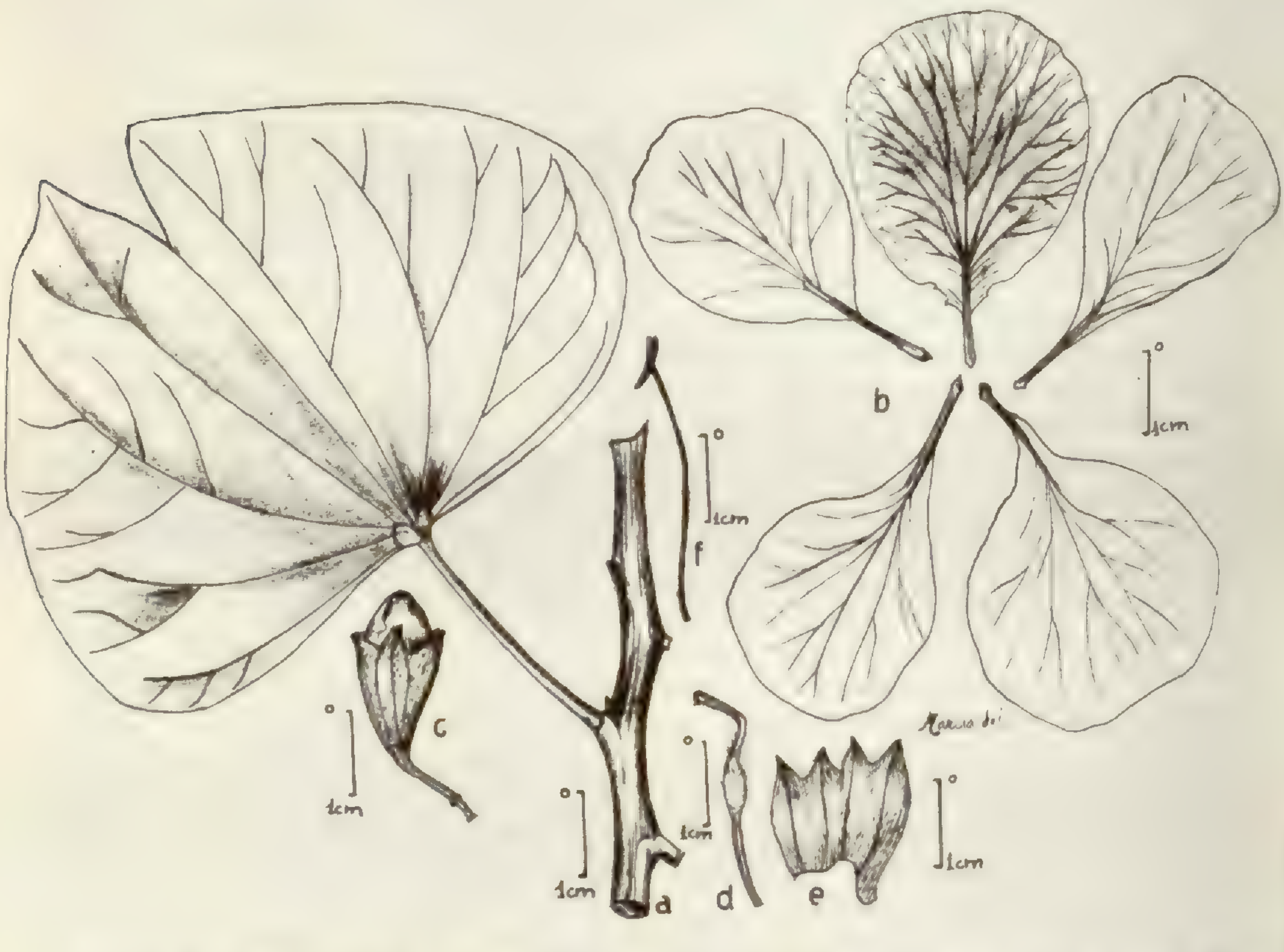
BRASIL - Estado de São Paulo: Município de Pereiras, entre Conchas e Pereiras, Fazenda São Luiz, 2/III/1964. "Na mata secundária. Árvore de mais ou menos 10 m de altura. Flores brancas com o estandarte amarelo". Hermes M. de Souza s.n. (SP 30242. HOLOTYPUS).

In this work we present a new species of the genus Bauhinia,

of the Family Leguminosae. A species was sent to us by our colleague, Hermes Moreira de Souza, of the Instituto Agronômico de Campinas, together with other species to be identified. The specimem of the genus Bauhinia called our attention, since it seemes different from the species already known and frequently identified for the State of São Paulo. After an extensive bibliographic research, we reached the conclusion that we had a new species of the genus.

The name was chosen in honor of the collector, Agronomist Engeneer Hermes Moreira de Souza.

We take the opportunity to give the biologist Mr. Oswaldo Handro many thanks for the Latin diagnosis.




Bauhinia hermesiana N.Mattos.- a) stem with leaf; b) petals; c) floral bud; d) gynecium; e) calyx; f) stamen.

# MATERIALS TOWARD A MONOGRAPH OF THE GENUS LIPPIA. IV

Harold N. Moldenke

## LIPPIA GRAVEOLENS H.B.K.

Lippia berlandieri is based on three collections: (1) collected by Jean Louis Berlandier (no. 2252) between Santander and Vittoria, Mexico, along the Texas-Mexico border, in November, 1830, and deposited in the DeCandolle Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where it was photographed by Macbride as his type photograph no. 33929, (2) collected by G. Andrieux (no. 166) near Oaxaca, Mexico, before 1835, and (3) collected by Carl August Ehrenberg (no. 720) on mountainsides near San Bartholomo, the last two originally deposited in the herbarium of the Botanisches Museum at Berlin, but now destroyed.

The type of Lantana origanoides was collected by Henri Guillaume Galeotti (no. 784), but Dr. Robyns has reported to me in a letter dated April 3, 1939: "We have been unable to find in our herbarium [Jardin Botanique de l'Etat, Brussels] the type specimen Galeotti 784 which is probably lost. But the specimen I am sending [Galeotti 756] has been authenticated by Martens & Galeotti." Lippia suaveolens is based on a collection made by Marcus Eugene Jones (no. 29373) at Laredo, Webb County, Texas, and deposited in the herbarium of Pomona College at Claremont, California.

It is worth pointing out here that the Lantana odorata of Aiton, referred to in the synonymy, is a synonym of L. involucrata L.; that of Linnaeus is L. involucrata var. odorata (L.) Moldenke; and that of Weigelt is Lippia alba (Mill.) N. E. Br. The Lippia geminata of H.B.K., of Humboldt & Bonpland, of Humboldt & Kunth, and of Kunth are also Lippia alba (Mill.) N. E. Br., while that of Millspaugh is Lantana microcephala A. Rich.

Lippia graveolens has been collected on mountains and low mountains, hills, limestone or limestone-shale hills almost destitute of soil, low or rocky hills, gravel or gravelly hills, "dry crevicious hills", steep or bushy hillsides, gravelly hilltops, mesas, deserts, rocky or dry rocky slopes, and brushy plains or woods. It grows in sand, rocky, clay, or gravelly limestone, or sandy soil, sandy loam, scrub, arid or open desert scrub, thickets and dense thickets, canyons, chaparral, cleared areas, gravel-pits, foothills, thick underbrush, dry creekbeds, thorn forests, lowlands, shrub grasslands on limestone mountains, and woodland associations with oak, pine, and juniper on mountain summits, among scattered oaks, at the base of rocky slopes, and along rivers and dry creekbeds, at altitudes of 50 to 3100 meters. In Texas it inhabits dry and rocky hills, valleys, and arroyos and in chaparral and open desert scrub from Brewster to Cameron northeast to Austin

and Houston Counties. In Yucatán it grows in rocky soil and on the slopes of hills and mesas. It grows from southern Texas south to Costa Rica, flowering and fruiting in every month of the year. In Texas it is said to bloom from March to December, while Palmer says that in Guerrero it flowers and fruits from October to March.

In Texas it was collected by Tharp & York in brushland along railroad cuts; Warnock & Surratt found it a "frequent shrub" in Terrell County, Runyon describes it as "frequent" and as "abundant in gravelly hills" in Starr County, while Hanson reports it "frequent in canyons" and "common in rocky valleys". In Brewster County Warnock says it is "infrequent along roads", "infrequent... in dry arroyos", "rare in ravines", and "a frequent shrub along highway". In Hidalgo County "a few plants" were observed by Cory. Rowell, Webster, & Barkley found it in "granitic soil on cliff of sandstone and soft granite," while Hinckley & Warnock report it "frequent and widespread in limestone soil on low sedimentary hills".

In Mexico it was collected by Waterfall in "clay valleys with acacias and other shrubs" in Coahuila; Hinton found "small colonies in rock-jumbled canyons" and Muller says it is an "abundant constituent of the desert shrubs in Larrea-Flourensia desert" in the same state. In Durango it occurs in "shrub-grassland on the south slope of limestone cerro" according to Gentry; in Zacatecas McVaugh describes it as "occasional in stream valley and nearby rocky oak-covered mountainside", while in the state of México it inhabits "deciduous spiny woods in barranca at edge of river" and "wet rocky spots in mixed woods" according to Matuda. Feddema describes it as an "occasional shrub in wooded areas in open sun in dry woodland with Acacia and Bursera" in Nayarit. Smith, Peterson, & Tejeda found it "in primarily thorn-scrub-cactus cover with evidence of former oak forest at high elevations along road, rock outcrops frequently calcareous" in Puebla, while in Tamaulipas, according to Crutchfield & Johnston, it lives on "limestone hills with short brush". Rzedowski found it in "ladera caliza con vegetación de Helietta parvifolia" and in similar localities with Agave striata. Standley found it "abundant on damp brushy slopes" in Guatemala. He reports (1938) that it is "cultivated frequently in gardens.....The aromatic leaves are used in Costa Rica for flavoring food, also medicinally." Calderón & Standley (1941) state that it is cultivated also in El Salvador.

E. F. Castetter, in a letter to me dated January 31, 1955, states that in 27 years of botanical collecting in New Mexico he has never seen this species in that state. It is possible that the two collections cited below from New Mexico are mis-labeled and may have come from adjacent western Texas.

The species is rather variable in leaf characters — Steyermark 29371, for instance, is a form with large, thin, hairy leaves; G. L. Fisher s.n. [Aug. 20, 1937] has the leaves dark, thin, and very hairy, and is certainly not very similar to Pringle 11083. It has been widely misidentified — Millspaugh (1895) cites it as L. orig-

anoides, while Lundell (1937) cites it as L. alba. Standley (1930) is in error in stating that the L. geminata of Millspaugh (1900) and of Millspaugh & Loesener (1905) is L. graveolens. Actually, the specimens cited in both these references are Lantana microcephala A. Rich. His comment (1924), however, to the effect that it is very doubtful whether L. berlandieri differs in any important characters from L. graveolens, is quite true. Following Schauer, Standley distinguishes the two species in his key by the size of the leaves -- 3.5—5 cm. long in L. graveolens and only 1.5--3.5 cm. long in L. berlandieri. Examination of a large series of specimens from Texas, Mexico, and Central America has convinced me that the two taxa are conspecific.

Collectors differ considerably in their description of the flower color. The corolla is described as "yellow" on Muller 3002, Stanford, Retherford, & Northcraft 96, and Warnock & Surratt 9827; "yellowish" on Lundell & Lundell 9792; "cream-color" on Correll & Johnston 18041; "creamy-white with a yellow eye" on Lundell & Lundell 9906 & 12340; "cream changing to yellow in eye" on Sharp 441341; "cream-white with yellow throat" on Feddema 1247; "white with yellow eye" on Lundell & Lundell 9807 and McVaugh 17665; and "white" on Clover 39 & 1676, Frye & Frye 2353, Hinton 16571, 13061, 13162, & 13318, Lundell & Lundell 8803, Ripley & Barneby 13279, Runyon 1721 & 2538, Smith, Peterson, & Tejeda 3977, Standley 74025 & 74094, Steyermark 29371, Tharp, Johnston, & Turner 3509, and White 2072 & 2120.

Vernacular names recorded for the species are "ahuiyac xihuitl", "grégano", "hahauiyac xihuitl", "hierba dulce", "hierba olorosa", "Mexican oregano", "oreganillo", "oregano", "orégano", "oregano cimarron", "oregano cimarrón", "origano", "red brush", "romerillo de monte", "tabay", "tarbay", "té del país", "xakilche", and "yerba dulce". It should be noted that "té del país" is applied also to Phyla stoechadifolia (L.) Small, and "oreganillo" to Lippia cardiostegia Benth., L. myriocephala Schlecht. & Cham., and L. umbellata Cav. Standley (1930) states that the application of the names "tabay" and "tarbay" to this species is doubtful.

Calpouzos (1954) says "Oregano is becoming a popular herb in America. The botanical identity of the plants sold as oregano in the United States has been in doubt. Most of the plants belong to the genus Lippia, of the family Verbenaceae, and come from Mexico. The rest of our supply of this herb comes from Europe. These latter plants belong to the genus Origanum of the family Labiatae. Species in other genera are also called 'oregano', or some variation of this name, in many parts of the world. The term 'oregano' should not be used to refer to only a single plant species but rather to a number of species, all having in common a particular herb. flavor." The name "oregano", "oregeno", "origano", or "oragano" is applied also to Lippia affinis Schau., L. formosa T. S. Brandeg., L. fragrans

Turcz., L. micromera Schau., L. micromera var. helleri (Britton) Moldenke, L. origanoides H.B.K., L. palmeri S. Wats., L. palmeri var. spicata Rose, Lantana achyranthifolia Desf., L. involucrata L., L. trifolia L., Coleus amboinicus Lour., Hedeoma floribunda Standl., H. patens Jones, Hyptis albida H.B.K., H. americana (Aubl.) Urb., H. capitata Jacq., H. suaveolens (L.) Poit., Limnophila stolonifera (Blanco) Merr., Monarda austromontana Epl., Ocimum basilicum L., Origanum majorana L., O. vulgare L., Policmintha longiflora Gray, and Salvia sp.

Gaumer (1907) states: "Lippia graveolens: stimulant, expectorant, and tonic. The fluid extract of Lippia is a diffusible stimulant which is employed with excellent carminitive effect against flatulency and nervous meteorism, is appreciated greatly in primitive fevers. It is also much used in the non-febrile state of cholera morbus and against all kinds of excessive fluxes, also against certain pernicious fevers. This is the plant of which an extract is used with much good effect in the treatment of debility and atony of the cerebral and spinal nerves, in the treatment of paralysis of the movement of voluntary muscles and organs of sense. It is employed with good effect against muscular debility and stupor of the senses consequent upon serious illnesses and the weakness which appears during convalescence; against headaches of debilitate, delicate, and nervous persons, eye-ache, vertigos observed in people dedicated to intellectual pursuits, and producing a happy cure for essential hypochondria. It has expectorant properties and effects changes in the bronchial mucous membranes. It is an excellent remedy for chronic bronchitis, and also for some catarrhal affectations of the respiratory system. Dose 1 to 5 drops." A pencilled note of the sheet of Gaumer 832 in the herbarium of the Chicago Natural History Museum adds "Extensively used as a condiment; also used as an anodyne." Standley (1924, 1930) confirms that the species is used in domestic medicine in Yucatán as a stimulant, tonic, expectorant, emmenagogue, and demulcent, especially in the treatment of cholera morbus, fevers, bronchitis, and catarrh, and that the aromatic leaves are used for flavoring food.

Material of L. graveolens has been misidentified and distributed in herbaria under the names L. alba (Mill.) N. E. Br., L. geminata H.B.K., L. lantanoides Coult., L. origanoides H.B.K., L. wrightii A. Gray, Lantana involucrata L., L. macropoda Torr., L. montevidensis (Spreng.) Briq., L. sp., Larrea tridentata DC., Tournefortia trichocalycina DC., Aloysia sp., and Satureja sp.

On the other hand, the V. H. Chase 7482, R. S. Ferris 5927, M. E. Jones 23563, and York s.n. [Brownsville, 3-19-1907], distributed as L. graveolens, are L. alba (Mill.) N. E. Br.; Bourgeau 1471 & 2983, Galeotti 752, and Edw. Palmer 1137 are L. hypoleia Briq.; Curran & Haman 606 & 966, Dawe 499, and Saer 62 are L. origanoides H.B.K.; Galeotti 795j is L. pringlei Briq.; Shreve

6150 & 6173 are Lantana velutina Mart. & Gal.; and Whitehouse s.n. [El Paso] is not verbenaceous, possibly a mint or a species of Eupatorium.

Tharp s.n. [6-16-1928] is a mixture with Aloysia wrightii (A. Gray) Heller, Frye & Frye 2353 is a mixture with Lantana macropoda Torr. and L. microcephala A. Rich., Warnock 831 is a mixture with Lantana macropoda Torr., and Steyermark 46285 is a mixture with Phyla scaberrima (A. L. Juss.) Moldenke.

The label on E. W. Nelson 6802, cited below, originally was inscribed "6201" in the Britton Herbarium. Mercedes Aguilar Hidalgo's name is often written "Mercedes Aguilar" or "Mercedes Aguilar H." E. P. Johnson 81 bears a label inscribed "Yucatan & Tabasco", but Millspaugh (1895) cites it as from Yucatán. The Ecology Class Univ. Texas s.n., cited below from Webb County, may actually have come from Zapata County — the label reads "Laredo—Zapata".

Glaziou (1911) cites his no. 9987 from Espirito Santo, Brazil, but this is obviously a misidentification. Gentry (1942) cites Shreve 6150 and 6173 from the Shreve Herbarium, but these collections are both Lantana velutina Mart. & Gal.

The records of L. graveolens from La Libertad, Guatemala, in my previous publications were based on Aguilar Hidalgo 40, which proves to have come from a locality "La Libertad" in El Petén.

In all, 440 herbarium specimens, including type or authentic material of most of the names involved, and 6 mounted photographs have been examined by me.

Citations: TEXAS: Austin Co.: Parry, Bigelow, Wright, & Schott 819 (Mi). Brewster Co.: H. C. Hanson 614 (N), 709 (Ka—60654); Hinckley 1555 [Warnock 461052] (N); Hinckley & Warnock 461031 (N, Ok), 461035 (N, Ok); E. G. Marsh 148 (G); B. H. Warnock 831, in part (Au), 13065 (Rf), W.831 (N), s.n. [Sperry 831] (Om); Warnock & Hinckley 3730 (N), 3739 (N), 461031 [Hinckley 1550] (Au, S), 461035 [Hinckley 1550] (Au, S), 461052 [Hinckley 1555] (Au). Cameron Co.: Nealley s.n. [Pt. Isabel, 1891] (Au); R. Runyon 154 (G); A. C. V. Schott s.n. [Rio Bravo del Norte] (C). El Paso Co.: C. Wright 459 (Ca—215389, G, T). Hidalgo Co.: Clover 39 (Mi, N); Correll & Johnston 18041 (Rf); Cory 51337 (Sm); J. A. Drushel 6323 (Ur); Lundell & Lundell 8803 (G, Ld, Mi, N), 9807 (Ld, N), 9906 (Ld, N); I. Shiller 736 (Au); Small & Wherry 11921 (N); Tharp & York 51-252 (St); Vogd s.n. [Pharr, June 18, 1947] (S); Mrs. E. J. Walker 22 (Au, G), s.n. [Rio Grande Valley, Feb. 2, 1942] (Au, Sm); M. L. Walker 104 (Au, S); Wiegand & Wiegand 1987 (It). Houston Co.: S. M. Tracy 9158 (Au, G, It, N, Tr, Tr, Tr, Tr, Up—50917, Ws). Jim Hogg Co.: Tharp 5904 (Au). Maverick Co.: Pringle 9034 (G, It, Me, Me, Me, Vt). Presidio Co.: Havard 24 (G). Starr Co.: Clover 1375 (Fs, N), 1676 (I, Mi, N); D. S. Correll 14895

(Rf); Innes 397 (G); Lundell & Lundell 9792 (N); A. R. Moldenke 182 (Fg); Ripley & Barneby 9047 (N); Rose & Russell 24363 (G, W—1369640); R. Runyon 1721 (Rr), 2538 (N, N); Tharp 5905 (Au, Au), s.n. [North of Rio Grande City, 6-16-28] (Mi, N); C. Wright s.n. [East side of Rio Grande, 1848] (G). Terrell Co.: Warnock & Surratt 9827 (Rf). Val Verde Co.: Cory 3416 (G), 19427 (G), 26273 (Tr), 38065 (N, N), s.n. [Langtry, July 1924] (Tr), s.n. [Langtry, Aug. 1924] (Tr); G. L. Fisher s.n. [Langtry, July 18, 1922] (Hp, Vt); Parks & Cory 19425 (Tr), 26719 (Tr); Rose & Fitch 17978 (N); E. D. Schulz 2012 (Wi). Webb Co.: Baird s.n. [Fall, 1936] (N); Cantu, Covell, & McCart 33 (Ok); Ecology Class Univ. Texas s.n. [Laredo-Zapata, 2.29.30] (Au); M. E. Jones 29186 (G, It, Po—199863), 29373 (Po—200131, Po—201279), s.n. [Laredo] (Po—199873); Martínez & Trevino 30 (Ok); Tharp, Johnston, & Turner 3509 (St). Zapata Co.: D. S. Correll 20782 (Rf); Cory 28139 (N), 35930 (N, N); Tharp 3697 (Au). County undetermined: Havard s.n. [1881] (Mi); Nealley 313 (Du—90916); Neatby s.n. [western Texas, Oct. 1890] (N). NEW MEXICO: County undetermined: LeRoy s.n. (Pa); C. Wright 1507 [Paneter Caves, N. Mex.] (G, T). MEXICO: Campeche: Perrine s.n. [Campeache] (T). Chiapas: Seler & Seler 3043 (Du—283955, G, Gg—245820). Chihuahua: Hewitt 337 (G); LeSueur 191 (Au, G), s.n. [Meoqui, 8/6/36] (Au, Ca—713074, G, Gg—320025); S. S. White 2063 (G, Mi), 2072 (Du—278210, Mi), 2120 (Du—287908, G, Mi). Coahuila: Aguirre 406 (N); Aguirre & Reko 37 (N); Herb. Inst. Biol. Univ. Nac. Mex. 1938 (Me), 7145 (Me); Hinton 16571 (G, N); I. M. Johnston 7038 (G); M. E. Jones 361 (Po—68825); Kenoyer & Crum 2622 (G, Mi), 3164 (Mi); E. J. Marsh 418 (St), 542 (Au); M. Martínez 7145 (Me); O. H. Muller 3002, in part (Ca—719562, Mi); E. W. Nelson 6802 (N); Edw. Palmer 362 (G), 370 (Ca—882481), 736 (A, G, G, N), 1025 (C, G, Io, Pa, Vt), 1026 (G, Pa); C. C. Parry 28 (G); Pringle 215 (G, Vt); Purpus 4520 (Ca—144791), s.n. [Torreon, 1902] (Ca—139674); Ripley & Barneby 13279 (N, N, N); Shreve 8420 (Fs), 8731 (Fs), 9413 (Ca—731698, Fs, Mi); Shreve & Tinkham 9579 (Ca—664998, G, Mi); A. H. Schroeder 31 (G); Stanford, Retherford, & Northcraft 96 (Ca—713862, Du—291288, G, N, Se—70494); Warnock & Barkley 14821m (Au); Waterfall 15801 (St); S. S. White 1938 (Mi, Oa—6688); Wynd & Mueller 87 (Fs, G, I, N, S, St). Durango: H. S. Gentry 6833 (Ak—22803, G, Mi, N); E. W. Nelson 4694 (G); Edw. Palmer 539 (Ca—104945, G, N, S, S). Federal District: Northcraft 7 (La, La); Rosenhouse 16146 (Kr). Guerrero: Degener & Degener 26216 (N, W); Hinton 6902 (A, K, N); Lemmon & Lemmon 203 (Ca—100954, G); H. E. Moore 5189 (Ca—918895, G, N); Edw. Palmer 167 (C, Ca—104927, G,

G); Pringle 9167 (G, Gg--421290, Mi, Vt); A. J. Sharp 44134l (N). Hidalgo: Gilly & Camp 20 (Mi, N); Herb. Inst. Biol. Univ. Nac. Mex. 7145 (Me); Kenoyer s.n. [Zimapan, 8-39] (Mi); Lundell & Lundell 12340 (Ld, Ld, Ld, Rf); Matuda 29564 (Z); Purpus 1414 (Ca--139656, G, N, Po--64344). México: Hinton 2655 (A, N, N), 5269 (G, N, N, N), 6370 (G, N); Matuda & al. 31723 (Ss), 31934 (Ss); Northcraft 7 (N). Michoacán: Hinton 13061 (Au, Du--290383, Mi, N, N, Rf, S, Ur), 13162 (G, Mi, N, N, Rf, S), 13318 (G, Mi, N, N, N, Rf, W--2020809). Morelos: Fröderström & Hultén 189 (S); Moldenke & Moldenke 19831 (Es, Lg, Mg, Mr, N, No, Ot, Sm); Pringle 11083 (Cm, Fs, G, Gg--421291, It, Mi, N, Vt). Nayarit: Feddema 1247 (Mi). Nuevo León: F. A. Barkley 14496A (G); Fernandez C. & Barkley 14496a (Au, N); G. L. Fisher s.n. [Monterrey, July 14, 1924] (Cm, Du--175925, Fs, Vi); Frye & Frye 2353, in part (It, N, Pl--111102, Se--65594); Heard & Barkley 14547 (Au, N); Johnson & Barkley 16035M (Au, Ca--763284, G, N); Kenoyer s.n. [Sabinas Hidalgo, Sep. 15, 1937] (Fs); Mueller & Mueller 159 (Au, G, Me, Me, Ur); Pringle 1934 (Br, C, Ca--104917, G, Mi, Pa, S, Vt), s.n. [near Monterey, 4 August 1889] (Ca--104918); Quarles van Ufford 39 (Ut); Seler & Seler 1053 (G), 1092 (G); Shreve & Tinkham 9813 (Fs, G, Mi). Oaxaca: C. C. Deam 100 (G); Galeotti 756 (Br, Br, N-photo); A. Gonzalez 410 (G); V. Gonzalez 419 (G); H. S. McKee 11001 (Lw); E. W. Nelson 1210 (G), 1977 (G); Pringle 6258 (Br, C, Ca--104928, Cm, G, G, Gg--152308, Gg--162998, Io--38719, Me, Me, Me, Mi, Mm--15409, S, Vt); Rowell, Webster, & Barkley 17M490 (Mi, N); Seler & Seler 1391 (G); L. C. Smith 696 (G, Me). Puebla: Bravo Hollis 7145 (Me); Patoni 1007 (Me); Purpus 482 (Ca--139664), 3401 (Ca--139654); Rose & Gay 5930 (G); Smith, Peterson, & Tejeda 3977 (G, N, W--2397994). Quintana Roo: G. F. Gaumer 1527 (F--58325). San Luis Potosí: G. L. Fisher s.n. [Aug. 20, 1937] (Fs, N); Edw. Palmer 711 1/2 (Pa); C. C. Parry 711 1/2 (Io); J. Rzedowski 6479 (Au--170138), 6686 (Au--170117). Sinaloa: T. S. Brandegee s.n. [Cerro Colorado, Nov. 1, 1904] (Ca--104916); J. Gonzalez Ortega 6602 (Du--173304, G); M. E. Jones 23233 (Po--153925); Edw. Palmer 2771 (G). Tamaulipas: O. M. Clark 6641 (N); Crutchfield & Johnston 4986 (Au--175055); Kenoyer & Crum 3545 (G), 3644 (G); Edw. Palmer 520 (G); Perkins & Hall 3324, in part (It); Stanford, Lauber, & Taylor 2226 (Du--366137, N, N). Vera Cruz: Purpus 1915 (Ca--139655, G, N). Yucatán: G. F. Gaumer 832 (Br, Ca--446227, Du--207671, F--36635, G, Gg--160699, Mi, N), 1984 (F--58782, G), 1985 (Po--174974), 24308 (A, G, N, S); Gaumer & sons 832 (A, A, S); Gutierrez Rivas 32 (F--189451); E. P. Johnson 81 (C); C. F. Millspaugh 41 (F--195226). Zacatecas: F. E. Lloyd 97

(Ca--368992); R. McVaugh 17665 (Mi); J. N. Rose 2412 (G); Shreve 9400 (Ca--731697, Fs, G, Mi). State undetermined: Berlandier 832 [de Santander a Vittoria] (G, T), 2252 [Macbride photos 33929] (G, Kr--photo, N--photo, N--photo, T); Coulter 1162 (G); C. C. Deam s.n. [Salina Cruz, Dec. 21, 1898] (Mi); Gregg 443 (G), 496 (G); Haenke 1470 (N), 1583 (N); Lehmann B.T.818 (V); C. C. Parry s.n. [1852] (Io); Purpus 1181 (Ca--139657); Sessé, Mociño, Castillo, & Maldonado 2126 (Q), 2196bis (Q). GUATEMALA: El Petén: Aguilar Hidalgo 40 (F--713089, G, I, Mi, N, N); Steyermark 46285, in part (Mi). Zacapa: P. C. Standley 74025 (W--1842940), 74094 (N); Steyermark 29371 (F--1043423). BAY ISLANDS: Mugeres: G. F. Gaumer s.n. (Sg--66302). NICARAGUA: Grenada: Lévy 250 (Cb, Cb, Cp, Cp, N--photo, Z--photo). COSTA RICA: Alajuela: Brenes 23110 (N). Guanacaste: Brenes s.n. [1910] (N, Si). San José: H. Pittier 1681 (Br). CULTIVATED: Costa Rica: Brenes 12238 [117; 717] (N). El Salvador: Calderón 1177 (G).

LIPPIA GRISEBACHIANA Moldenke, Phytologia 1: 279. 1938.

Synonymy: Lippia lantanifolia Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 19: 242. 1874 [not L. lantanifolia F. Muell., 1868]. Lippia asperifolia argentiniensis Gill. & Schau. ex Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 19: 242, in syn. 1874. Lippia lantanifolia Griseb. ex Alvarez, Fl. Sant. del Estero 106, sphalm. 1919. Lippia lantanaefolia Griseb. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947.

Bibliography: F. Muell., Fragm. 6: 151. 1868; Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 19: 242. 1874; Griseb., Pl. Lorentz. 194--195. 1874; Lorentz, Veg. Nordeste Prov. Entre Ríos, ed. 1, 150. 1878; Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 277. 1879; Lillo, Fl. Tucuman 94. 1888; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898; Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 21. 1900; Sanzin, Anal. Soc. Cient. Argent. Buenos Aires 88 (i--iv): 102 & 103. 1919; Alvarez, Fl. Sant. del Estero 106. 1919; Stapf, Ind. Lond. 4: 125. 1930; Moldenke, Phytologia 1: 279. 1938; Moldenke, Prelim. Alph. List Invalid Names 31. 1940; Moldenke, Lilloa 5: 405 & 422--423. 1940; Moldenke, Phytologia 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 43 & 95. 1942; Moldenke, Alph. List Invalid Names 31. 1942; Moldenke, Lilloa 10: 342--343. 1944; Moldenke, Phytologia 2: 83 & 107. 1945; P. I. Acuña, Catalog. Fl. Catamarq. 17. 1945; Moldenke, Alph. List Cit. 1: 73 & 95. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Lorentz, Veg. Nordeste Prov. Entre Ríos, ed. 2, 150. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 14. 1947; Moldenke, Phytologia 2: 386. 1947; Moldenke, Lilloa 14: 33, 36, & 42. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 62. 1948; Moldenke, Alph. List Cit. 2: 368, 377, 378, 440--442, 535, 586, 600, & 620 (1948), 3: 661, 662, 673, 732, 736, 746, 804, 863--865, & 907--910 (1949),

and 4: 1080, 1089, 1091, 1092, 1148, 1168, 1172, 1203, & 1293. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 104 & 190. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Troncoso, Darwiniana 10: 73—75, fig. 2. 1952; Moldenke, Résumé 125, 313, & 461. 1959; Moldenke, Résumé Suppl. 10: 6 (1964) and 11: 7. 1964; Moldenke, Phytologia 12: 47 & 61. 1965.

Illustrations: Sanzin, Anal. Soc. Cientif. Argent. Buenos Aires 88: (i—iv): 103. 1919; Troncoso, Darwiniana 10: 74, fig. 2. 1952.

Aromatic woody or subligneous shrub, 0.3--3 m. tall, branched; branches cylindric, rigid; branchlets subtetragonal, striate, with reddish-brown bark, pubescent or with thinly dispersed long white hairs, denser and shorter toward the apex, glabrescent in age; leaves decussate-opposite; petioles 0.5--1 cm. long; leaf-blades oval or rhomboid-lanceolate, usually 2--8 cm. long and 1--3 cm. wide, rarely to 13.5 cm. long and 6 cm. wide, broadly cuneate at the base and attenuate into the petiole, dentate along the margins with sharp broad teeth on the larger leaves, crenulate on the smaller ones, reticulate-veined, with short, rigid, callous-based hairs along the margins above, conspicuously venose and glandular-punctate beneath and pubescent on the venation, the venation impressed on the upper surface; inflorescence axillary, solitary, pedunculate, many-flowered; peduncles to 4.5 cm. long, slightly ampliate toward the apex, pubescent; outer bractlets lanceolate, 4—6 mm. long, 1.5—1.8 mm. wide, sparsely pubescent and ciliate, with a well-marked midrib and 2 or 3 visible lateral veins, the inner ones oval and shorter, 2.5--3.5 mm. long, sub-glabrous but conspicuously ciliate; calyx tubular, 2.5--3 mm. long, 2-lipped, glandular-punctate, hirsute on the lower half, pubescent on the upper half, the lips membranous, 1--3-dentate, densely ciliate, the teeth very short, irregular; corolla hypo-crateriform, varying from purple, pale-lilac, or violet to pink, rose, bluish-white, white, or even yellowish, 2-lipped, the tube ampliate upwards, pubescent and glandular-punctate on the upper portion outside, the upper lip short, entire, the lower lip much larger and 3-lobed; stamens and pistil normal for the genus; fruit dry, oboval or oval, 1.8--2 mm. long, 1--1.2 mm. wide, smooth, included by the fruiting-calyx, separating into 2 cocci, convex on the back, flat on the ventral surface, the cocci 1-celled, 1-seeded; usually only 1 seed produced, oboval, with endosperm.

This species was based by Grisebach on two collections made by Paul Günther Lorentz, (1) in thickets at Cueste de San Javier, Tucumán, and (2) frequent in the valley of Granadillas, Catamarca, Argentina. Troncoso (1952) says of the endosperm "por lo menos hasta poco antes de la madurez una delgada capa de albumen rodea el embrión".

The species has been collected in fields, thickets, and dry open places, on banks and riverbanks, slopes, and mountainsides, in valleys, and below the rim of plateaus, at altitudes of 700 to 2800 meters, flowering from October to May, fruiting in March. Venturi 9432 has especially large leaves. The corollas are de-

scribed as "purple" on Bartlett 19619, Meyer 3090, and Rodriguez 1281, "violet" on Venturi 4290 & 7808, "pale-lilac" on Herb. Osten 12200, "pink" on Job 1375, "rose" on Olea 93 and Venturi 2689 & 9138, "yellowish" on Venturi 10493, "white" on Venturi 4296, and "white or bluish-white" on Fries 1. Possibly several color forms are represented here, but some of the variation is probably due to fading of the flowers with age or to differences in terminology on the part of the collectors. The L. lantanifolia var. crenata Griseb. is a synonym of L. junelliana (Moldenke) Troncoso.

Vernacular names recorded for the species are "cedrón del monte", "palo amarillo", "poleo", "salvia amarilla", and "salvia morada". The name, "cedrón del monte", is applied also to Aloysia gratissima (Gill. & Hook.) Troncoso, while "poleo" is also applied to L. affinis Schau., L. alba (Mill.) N. E. Br., L. integrifolia (Griseb.) Hieron., L. turbinata Griseb. and its varieties, and Mentha pulegium L.

Lippia grisebachiana is used as a blood-purifier in Argentina. Material has been misidentified and distributed in herbaria under the names Lantana balansae Briq., Cordia sp., and Verbena sp. On the other hand, the Venturi 815 distributed as L. grisebachiana is actually L. junelliana (Moldenke) Troncoso. T. Meyer s.n. [San Pedro de Colalao, 4-I-1940] is a mixture with Lantana aristata var. cabrerae Moldenke. Job 1375 was erroneously cited in Lilloa 5: 405 (1940) as Lantana balansae Briq.

In all, 76 herbarium specimens and 2 mounted photographs have been examined by me.

Citations: ARGENTINA: Catamarca: H. H. Bartlett 19619 (Mi, W—1907566); Castellanos s.n. [Gracián, Jan. 2, 1940; Herb. Mus. Argent. Cienc. Nat. 33876] (N), s.n. [Pomancillo, Jan. 11, 1940; Herb. Mus. Argent. Cienc. Nat. 33879] (N); Job 1375 (N); Jörgensen 1025 [Herb. Osten 11423] (Ca--192503, Ug, W—704751), s.n. [Andalgalá, Feb. 1916; Herb. Fac. Cienc. Med. B. Aires 1025] (N--photo, Sp—25778, Z—photo); Luna Risso 656 (N); Peirano s.n. [Londres, Jan. 22, 1934; Herb. Inst. Miguel Lillo 32845] (N), s. n. [Los Boganes, April 24, 1935; Herb. Inst. Miguel Lillo 32867] (N); Rodriguez Vaquero 902 (N, S); Schickendantz 21 (W--1233810); Schreiter 10550 [Herb. Inst. Miguel Lillo 32858] (N). Córdoba: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 31196] (N). Jujuy: Claren 11794 (S); Venturi 9432 (W--1591419), 10493 (S). La Rioja: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 27/2024] (N), s.n. [Herb. Mus. Argent. Cienc. Nat. 28/325] (N); Venturi 7808 (Gg--166712, S); Yepes s.n. [Herb. Mus. Argent. Cienc. Nat. 18855] (N). Salta: R. E. Fries 1 (N, S); Garolera & Romero s.n. [Cuesta del Obispo, 21/I/47] (N), s.n. [Cuesta del Obispo, 23/I/47] (N); Lorentz & Hieronymus s.n. [San José, II.73] (S); D. Rod-

riguez 1281 (N, N), s.n. [Herb. Mus. Argent. Cienc. Nat. 23770] (N); Venturi 6929 (W--1591500). Tucumán: Baer 98 (S); Bailetti 33 [Herb. Inst. Miguel Lillo 32399] (Vi); Bruch s.n. [Valle del Taff, 1908] (N, Ug); Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 14815] (N); Krapovickas 3240 (N); Lillo 4304 [Herb. Inst. Miguel Lillo 32382] (Au, N, W--1802546), 7445 [Herb. Inst. Miguel Lillo 32393] (N); T. Meyer 3090 (N, N), 9766 (N, Vi), 11989 (N), s.n. [San Pedro de Calalao, 4-I-1940] (N); Monetti 1625 [Herb. Inst. Miguel Lillo 32353] (N), 1935 [Herb. Inst. Miguel Lillo 32388] (N); Olea 93 (S); R. Rocha 3825 (Ba); D. Rodriguez 346 [Herb. Inst. Miguel Lillo 32391] (N), s.n. [Herb. Mus. Argent. Cienc. Nat. 23891] (N); Schreiter 372 [Herb. Inst. Miguel Lillo 32622] (N), 969 [Herb. Osten 15087] (Ug), 2356 [Herb. Inst. Miguel Lillo 32624] (N, W--2407899), 4911 [Herb. Inst. Miguel Lillo 32340] (N), 9732 [Herb. Inst. Miguel Lillo 32828] (N, Ug--4950), s.n. [Gualinchay to Mal Paso, Dec. 1, 1917; Herb. Osten 12200] (Ug); Venturi 2689 [Herb. Osten 17264] (N, Ug, W--1343291, W--1591264), 4290 (Ca--342555, N, N, W--1591437), 4296 (W--1343316), 9138 (W--1591418), s.n. [Herb. Mus. Argent. Cienc. Nat. 27/1414] (N); E. Villa 661 (N).

LIPPIA HASSLERIANA Chod., Bull. Herb. Boiss., sér. 2, 2: 821. 1902.

Synonymy: Lippia hassleriana Briq. ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941.

Bibliography: Chod., Bull. Herb. Boiss., sér. 2, 2: 821. 1902; Briq. in Chod., Pl. Hassler. 1 (9): 200. 1902; Briq. Ann. Conserv. & Jard. Bot. Genèv. 7-8: 305. 1904; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 340. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (10): 489. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Lilloa 5: 423. 1940; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 41, & 95. 1942; Moldenke, Alph. List Invalid Names 31. 1942; Moldenke, Lilloa 8: 424. 1942; Moldenke, Alph. List Cit. 1: 26, 51, & 263. 1946; Moldenke, Lilloa 14: 42. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 63. 1948; Moldenke, Alph. List Cit. 3: 693 (1949) and 4: 1169. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 99, & 190. 1949; Moldenke, Résumé 93, 116, 313, 417, & 461. 1959; Troncoso, Darwiniana 12: 257, 262, & 263, pl. 1, fig. 2. 1961; Moldenke, Phytologia 12: 24. 1965.

Illustrations: Troncoso, Darwiniana 12: 262, pl. 1, fig. 2. 1961.

Erect shrub or subshrub, 0.3--1 m. tall; stems woody, 2.5--3 mm. wide, scabrous with sparse upwardly curved bristle-like hairs; leaves decussate-opposite or ternate, sessile or subsessile, the blades coriaceous, broadly elliptic, 3.3--4.2 cm. long, 2.6--3 cm. wide, often apiculate at the apex, sparsely serrate above the middle along the margins, shiny and rugose above, paler and scarcely

or not at all rugose and setulose beneath, with 5 veins issuing from the base, 2 of which follow approximately the basal margin of the blade, the other 3 suberect but not extending a great distance from the base; inflorescence distinctly paniculate, ample, pedunculate; bractlets coriaceous, very squamose, slightly pilose on the back or glabrescent; calyx 2-alate, glandular, the wings membranous, vesiculate, long-ciliate, but less so than in L. hirta; corolla hypocrateriform, white or rosy-white.

This species was based by Chodat on two collections made by Emil Hassler -- in whose honor it was named -- in Paraguay: (1) no. 5685, collected in fields near Jepui-guazú in December of 1898 or 1899, and (2) no. 5924, collected in fields near the Río Capibary in December, 1900, both deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where the latter was photographed by Macbride as his type photograph no. 24653. Troncoso (1961) refers to the 5924 collection as lectotype and 5685 as syntype. The Briquet 1902 and 1904 references given in the bibliography above are often cited as "Plantae Hasseleriana IX (1902) 200" and "X (1904) 489".

Chodat & Hassler (1902) say "Species affinis L. hirtae, differt foliis subtus et superne minus nervosis, minus plicatis, bracteis glabrescentibus pilis basi multo minus bulbosis, facie superiore foliorum laevi minus rugosa....A L. glabrescente Cham. et Schld. forma foliorum et eorum facie superiore nitida habitu- que sat distincta."

The species has been collected in fields and shrubby campos, flowering from November to March, fruiting in December. The corolla is described as "white" on Balansa 1030 and Hassler 5924, and as "rosy-white" on Hassler 5685. Briquet (1904) says "Type de premier ordre, rapproché par M. Chodat des L. hirta Cham. et L. glabrescens Cham. Ce rapprochement nous paraît fondé en ce sens que le L. Hassleriana appartient comme les deux espèces citées à la section Dipterocalyx à cause de son calice bicaréné. Mais il s'écarte d'ailleurs notablement par l'ensemble de ses caracteres de toutes les autres espèces de la section Dipterocalyx et rapelle plutôt de groupe Corymbosae de la section Euzapania." Troncoso (1961) says: "Especie descrita por Chodat basándose en los sintipos Hassler 5924 y 5685. Estudiados los ejemplares del Herbario de Ginebra, aunque ambos representan exactamente la especie, ha seleccionado como lectotipo, Hassler 5924, por hallarse en la colección de fototipos de la serie del Museo de Chicago, No. 24653.....Lippia hassleriana pertenece a la sección Dipterocalyx (Cham.) Schauer a causa de su cáliz 2-alado, con alas largamente ciliadas. Esta carácter considerado por Chamisso de gran valor taxonómico, pues le sirvió para crear el género Dipterocalyx (Linnaea 8: 241, lám. 7. 1832), no fue correctamente interpretado por su autor. Según la ilustración dada por Chamisso, las alas aparecen como un simple repliegue del cáliz, por el contrario se trata de dos alas membranosas, vesiculosas. Este cáliz vesiculoso

es probablemente un medio de diseminación ya que las semillas en su madurez permanecen encerradas por el mismo. Igual tipo de cáliz presenta L. hirta (Cham.) Sch. (Dipterocalyx hirtus Cham.) y L. sclerophylla Briq." She cites the following 20 specimens not as yet seen by me: PARAGUAY: Balansa 1030 (Cb, K, P); Fiebrig 6022 (Bm, Cb, K, Si); Hassler 5685 (Bm--cotype, Cb--cotype, K--cotype, P--cotype), 5924 (Cb--cotype, K--cotype, P--cotype), 8988 (Bm), 9168 (Bm, Cb, K); T. Rojas 4136 (Si); Sparre & Vervoorst 2118 (MI).

In all, 17 herbarium specimens, including type material of both names involved, and 6 mounted photographs have been examined by me.

Citations: BRAZIL: Rio Grande do Sul: Borrmüller 372 (Cb, N, N--photo, Z--photo); Rambo 10004 (Rb). PARAGUAY: Balansa 1030 (Br, N, N), s.n. [1874--7] (S); Fiebrig 6022 (W--1159382); Hassler 5685 (Ca--935075--cotype, N--cotype), 5924 [Macbride photos 24653] (Ca--935076--cotype, It--photo of cotype, Kr--photo of cotype, N--cotype, N--photo of cotype, N--cotype, S--cotype, W--photo of cotype), 8988 (Ca--929001, N); T. Rojas 4136 (W--1444649).

LIPPIA HEDERAEFOLIA Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 593. 1847.

Synonymy: Lippia hederifolia Mart. & Schau. ex Stapf, Ind. Lond. 4: 125. 1930. Lippia hederaefolia Schau. ex Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942. Lippia hederaefolia Mart. ex Moldenke, Résumé Suppl. 10: 5, in syn. 1964.

Bibliography: Schau. in A. DC., Prodr. 11: 593. 1847; Schau. in Mart., Fl. Bras. 9: 250--251 & 307, pl. 41. 1851; Bocq., Adansonia 3: 244. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Luetzelburg, Estud. Bot. Nordéste 3: 224. 1923; Stapf, Ind. Lond. 4: 125. 1930; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 2: 486 (1948), 3: 689, 726, & 824 (1949), and 4: 1135 & 1301. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Revist. Sudam. Bot. 8: 167. 1950; Moldenke, Résumé 93, 313, & 461. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 8: 2 & 4 (1964) and 10: 5. 1964; Moldenke, Phytologia 12: 24, 145, & 166. 1965.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 41. 1851.

Small shrub or subshrub, 0.5--1 m. tall, simple at the base, few-branched above; branches elongate, rather rigid, spreading, several mm. thick, foliose toward the apex; branchlets tetragonal, angular, margined, scabrous, foliose above; leaves small, decussate-opposite, very short-petiolate; leaf-blades ovate or subrotund, 6--12 mm. long, 4--10 mm. wide, only 1/4 as long as the internodes at the base of the branches to equaling them farther up, acute at the apex, entire at the base, triangular or

subcuneate at the base and narrowed into the petiole, incised-serrate and subrevolute along the margins with 2--4 lobe-like teeth on each side, strigose-scabrous above, pale and punctate beneath, pinnately veined, the venation impressed above, prominent and scabrous-pubescent beneath; peduncles filiform, tetragonal, rather rigid, patent, many times longer than the leaves, often more than 2.5 cm. long; heads exserted, corymbose, finally 1.6--2 cm. wide; bractlets large, showy, lilac or red, petaloid, involucrate, ovate, 8--12 mm. long, acute or rounded at the apex, 5--7-veined, reticulate, pubescent, ciliate, finally slightly enlarged; calyx about 3 mm. long, hispid, the lobes acute, 2-dentate; corolla large, showy, rose to violet or purple, hypocrateriform, pubescent on the outside, its tube about 8 mm. long, usually equaling the bracts, slender, almost regular, slightly incurved, slightly puberulent within, the limb rather large, about 7 mm. wide, very slightly puberulent above, obscurely pink-veined, yellowish in the throat, the upper lobe rounded and emarginate, the lateral lobes ovate, obtuse, the lowermost lobe obovate-subquadrate; stamens didynamous, inserted in the lower part of the corolla-tube; filaments short; anthers subdidynamous; style and stigma normal for the genus; fruit unknown.

This very distinct species was based by Schauer on several collections from Minas Gerais, Brazil. He says (1847) "In campis deserti Serro-Frio dictis prov. Minarum Brasiliae (Mart.! Pohl! Vauth. h. bras. 196)" deposited in the Munich and DeCandolle herbaria, and (1851) "Crescit in campis deserti Serro Frio prov. Minarum, ad S. Dominici praedium: Martius; inter Estrena et Vieira do Matto et Piedade: Pohl; prope Sabara prov. Minarum: Vauthier (n. 196)." He places it in his Subsection "B" of Section Rhodolippia. Briquet (1895) also classifies it in Subgenus Zapania, Section Rhodolippia. The J. E. Pohl 167, cited below, is probably the Pohl collection referred to by Schauer -- it was photographed by Macbride in the herbarium of the Botanisches Museum in Berlin as his type photograph no. 17512, but is now destroyed.

The species has been found on rocky campos and desert fields, at 1000 meters altitude, flowering from May to July, as well as in September and November. Luetzelburg (1923) records it from the caatinga in Bahia. The flowers are described as "purple" on Williams & Assis 7050, "violet" on Mendes Magalhães 1769 & 4308, and "rose with a yellow throat" by Schauer. Material has been misidentified and distributed in herbaria as L. diamantinensis Glaz. and L. gardneriana Schau.

Hayek (1906) points out that his L. reticulata differs from L. hederaefolia in having the leaves reticulate-venose and pilose beneath and the bractlets hirsute.

In all, 9 herbarium specimens and 4 mounted photographs, including phototype material of all the names involved, have been examined by me.

Citations: BRAZIL: Minas Gerais: Heringer 5293 (Z); Markgraf, Brade, Mello Barreto, & Mendes Magalhães 3273 (Herb. Jard. Bot.

Belo Horiz. 28448, in part] (N); Mello Barreto 12142 (Ja--32307); Mendes Magalhães 1769 (Be--14566), 4308 [Herb. Jard. Bot. Belo Horiz. 45089] (N); J. E. Pohl 167 [Macbride photos 17512] (Kr--photo of cotype, N--photo of cotype, N--photo of cotype, W--photo of cotype), s.n. [Herb. Caes. Vindob. 1847 comm.] (Br--cotype); Williams & Assis 7050 (G, N). State undetermined: G. Gardner 5124 (W--702440).

LIPPIA HERBACEA Mart. ex Schau. in A. DC., Prodr. 11: 589--590. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 589--590. 1847; Schau. in Mart., Fl. Bras. 9: 244--245. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 691 & 710. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Phytologia 12: 24 & 102. 1965.

Perennial herb or shrub, 1.2--2 m. tall; root perennial; stems many, herbaceous, erect, obtusely tetragonal, sulcate along the sides, paniculate above, hirtous or hirtellous; internodes more elongate upwards; leaves decussate-opposite or approximate, sessile, mostly deflexed, ovate-lanceolate, 5--6.5 cm. long, about 2.5 cm. wide, gradually reduced in size upwards, acute at the apex, crenate-serrate along the margins, penninerved, very rugose, very rough above and strigose-hirtous with short callose hairs, foveolate and hirtellous beneath, the reticulation covered with longer appressed hairs, the floral leaves (bracts) lanceolate, the uppermost ones smaller or even obsolete; panicle ample, centripetal, naked, spreading, pyramidal or subfastigiate, 45--60 cm. long, the branches slender or filiform, opposite, tetragonal, spreading, rigid, glandular-hirtellous, the sympodia 5--7.5 cm. long; peduncles opposite, spreading, tetragonal-filiform, glandular-hirtellous; heads small, tetraquetrous-ovoid; bractlets herbaceous, ovate, imbricate, acute at both ends, strigose-hirtous, equaling the corolla-tube; calyx very short, bifid, hirtous; corolla very small, rose-colored, about 1.5 mm. long, its tube purple, subinfundibular, ampliate above, slightly curvate, puberulent above, the limb rose-colored, the lobes subemarginate, hirtellous, the lowest wider; fruit normal for the genus, rather large, obcordate, separating into two halves.

This curious species was based by Schauer on several collections from Brazil: (1) by Carl Friedrich Philipp von Martius (no. 1705) in wet places near Mauritia vinifera on the campos near Salgado on the west bank of the Rio São Francisco, Minas Gerais, and (2) by Johann Enamuel Pohl also in wet places on the campo in Minas Gerais, deposited in the Munich and Vienna herbaria respectively. In his 1851 publication Schauer cites also unnumbered collections by Pohl from near Pillar in Goías and from elsewhere in that state. The Martius cotype in the Munich herbarium was photographed by Macbride as his type photograph no. 20328.

The species has been collected in fields and wet places on cam-

pos, flowering in April and August. In all, 4 herbarium specimens and 4 mounted photographs, including phototype material, have been examined by me.

Citations: BRAZIL: Minas Gerais: Macedo 2214 (N, S), 2299 (N), 2444 (W--2196854); Martius 1705 [Macbride photos 20328] (It--photo of cotype, Kr--photo of cotype, N--photo of cotype, W--photo of cotype).

LIPPIA HICKENII Troncoso, Darwiniana 10: 69--72, fig. 1. 1952.

Bibliography: Troncoso, Darwiniana 10: 69--72, fig. 1. 1952; G. Taylor, Ind. Kew. Suppl. 12: 82. 1959; Moldenke, Résumé Suppl. 7: 6. 1963; Moldenke, Phytologia 12: 148 & 170. 1965.

Illustrations: Troncoso, Darwiniana 10: 70, fig. 1. 1952.

Branched unarmed shrub; branches rather woody, subcylindric, striate, with gray bark; this year's branchlets straight, subtetragonal, sparsely glandular-puberulent, the indument formed of simple hairs with resinous glands visible only under a hand-lens; principal internodes to 3 cm. long; leaves decussate-opposite, short-petiolate; petioles 2.5--5 mm. long, glandular-pubescent; leaf-blades somewhat bicolored, oval or oblong, 1--2 cm. long, 0.4--1.2 cm. wide, subacute at the apex, truncate and broadly subcuneate at the base, finely and regularly crenate along the margins except at the entire base, trinerved or penninerved, rugose especially along the margins above and finely reticulate, densely glandular-punctate and short-pubescent above, opaque and incanous-pubescent beneath especially on young leaves, glandular-punctate between the pubescence; venation impressed above, prominent beneath; inflorescence axillary, on this year's branchlets, fasciculate; peduncles short, 4--9 mm. long; heads 2--6 per axil, oval, 5--6 mm. long, lengthening to 10 mm. during anthesis, 10--12-flowered; bractlets membranous, stramineous, decussate in 5 or 6 pairs, imbricate, equitant to the middle, broadly oval, 5--6 mm. long, 3--4 mm. wide, acute and conduplicate at the apex, reticulate-veined, pubescent and densely glandular-punctate; flowers small, 6--7 mm. long, sessile; calyx short-tubular, membranous, 2--2.5 mm. long, densely pubescent and with larger hirsute hairs interspersed, glandular-punctate, 2-lipped, easily separable into two halves, the lips bidentate; corolla hypocrateriform, white or yellow, slightly 2-lipped, the upper lip entire or bilobed, the lower lip 3-lobed, the tube subcylindric and glabrous at the base, ventricose and pubescent at the middle, ampliate and densely glandulose at the apex, glabrous inside, the limb crimped along the margins; stamens 4, didynamous, inserted in the upper half of the corolla-tube where this is enlarged; style terminal, short, included, to 3 mm. long; stigma lateral; ovary oval, 0.5 mm. long, glabrous; young fruit oboval, smooth, glabrous, with the base of the style persistent on its apex, about 1.5 mm. long (without the style) and 0.8 mm. wide, with a marked longitudinal line indicating the 2 enclosed cocci, one of which usually is aborted; cocci 1-celled, the pericarp subcoriaceous, dry, thin, smooth and shiny within; immature seeds ellipsoid, white, 1--2 mm. long, basifixed.

The type of this species was collected by Lorenzo Raimundo Paro-

di (no. 14864) at an altitude of 1100 meters at Diquelos Sauces, La Rioja, Argentina, on February 16, 1944, and is deposited in the herbarium of the Instituto Darwinion at San Isidro, Argentina. The species is named in honor of Cristóbal María Hicken, founder of the Instituto Darwinion. It greatly resembles L. pendula Rusby and L. salviaefolia Cham. Miss Troncoso cites also Castellanos s.n. from Guasayán, Villa La Punta, Santiago del Estero, deposited as sheet no. 47556 in the herbarium at Buenos Aires. She says: "El ejemplar de Santiago del Estero (BAB 47556), presenta algunas diferencias con el tipo, que señalo a continuación: Ramas más vigorosas con hojas más grandes, hasta de 4,3 cm de long. x 2,7 cm. de lat. (sin el pecíolo), éstas son de superficie menos rugosa; la pubescencia es más serícea, principalmente en las hojas superiores; las brácteas son más subuladas y plegadas en el ápice, hasta de 7,8 mm de long. No disponiendo de más material de dicha región queda para más adelante valorar estas pequeñas diferencias."

She also comments that "L. Hickenii pertenece a la Secc. Goniostachyum Schauer.....caractenzada por presentar dos o varios capítulos por axilla, breves, poco alargados, con brácteas decusadas, plegadas, carenadas e imbricadas en 4 hileres. El carácter de las brácteas plegado-carenadas es poco marcado en la nueva especie, aunque son plegadas en el ápice. Presenta gran semejanza, principalmente en los caracteres florales, con la especie boliviana, Lippia dumetorum Herzog. La comparación de Lippia Hickenii con el ejemplar tipo de L. dumetorum (Herzog 1851; L, S,) permite señalar las siguientes diferencias: hojas mayores, do 6—7 cm de long. x 2,5—2,8 cm de lat., capítulos espiciformes más delgados y alargados, dispuestos preferentemente en el ápice de las ramas dándole un aspecto apanojado y brácteas más pequeñas, de 3—4 mm de long. Otra especie vecina es L. sidoides Cham., pero esta especie no posee las brácteas soldadas características de L. Hickenii. Esta diferencia fundamental la he podido comprobar por comparación gracias a la gentileza del Dr. F. C. Hoehne, da São Paulo, quien me envió material de L. sidoides determinado por el Dr. Moldenke y procedente de su área general típica (L. sidoides Cham., Brasil, Sao Paulo, Itú, A. Russell No. 82, X-1897; São Paulo, Sorocaba, A. Lofgren No. 248, X-1887; dupl. SI.)"

LIPPIA HIERACIFOLIA Cham., Linnaea 7: 375. 1832.

Synonymy: Lippia hieracifolia Schlecht. ex Steud., Nom. Bot., ed. 2, 2: 54. 1840. Lippia hieraciifolia Cham. ex Schau. in A. DC., Prodr. 11: 588. 1847. Lippia alegrensis Briq. ex Augusto, Fl. Rio Grande do Sul 235. 1946. Lippia hieraciifolia Briq. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia hieraciifolia Cham. & Schl. ex Moldenke, Résumé Suppl. 1: 19, in syn. 1959.

Bibliography: Cham., Linnaea 7: 375. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; Walp., Repert. Bot. Syst. 4: 55. 1845; Schau. in A. DC., Prodr. 11: 588—589. 1847; Schau. in Mart., Fl. Bras.

9: 242--243. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq., Arkiv Bot. Stockh. 2 (10): 20. 1904; Herter, Florul. Urug. 105. 1930; Herter, Revist. Sudam. Bot. 4: 185. 1937; Moldenke, Lilloa 5: 423. 1940; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 41, 43, & 95. 1942; Moldenke, Alph. List Invalid Names 31. 1942; Moldenke, Lilloa 10: 343. 1944; Moldenke, Alph. List Cit. 1: 12, 96, 192, & 195. 1946; Augusto, Fl. Rio Grande do Sul 235. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 13 & 14. 1947; Moldenke, Lilloa 14: 42--43. 1948; Moldenke, Alph. List Cit. 2: 358, 442, & 457 (1948), 3: 665, 689, 691, 703, 745, 816, 840, 848, 864, & 921 (1949), and 4: 1257. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 100, 104, & 190. 1949; Rambo, Sellowia 6: 60 & 84. 1954; Moldenke, Résumé 93, 119, 125, 310, 313, & 461. 1959; Moldenke, Résumé Suppl. 1: 19. 1959; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Moldenke, Phytologia 12: 24 & 84. 1965.

Dioecious suffruticose perennial; stems woody at the base, erect or ascending, mostly simple, slender, subterete, 0.5--1 m. tall, hirsute, leafy below, almost leafless and scapose above, issuing from an almost tuberous caudex, rarely with some axillary filiform branches above, racemose and strigose-canescent at the apex; principal internodes few, greatly elongated; leaves few, decussate-opposite, sessile, the blades obovate-oblong or lanceolate, 2.5--12.5 cm. long, 1.3--3.2 cm. wide, acute at the apex, entire below, crenate-serrate along the margins above, pennineryed, 3-plinerved on the larger ones, scarcely lineate above, strigose-hirsutulous on both surfaces, the upper ones distant and much smaller; peduncles axillary at the upper nodes, solitary, in 4's, or congested, longer than the floral leaves, about 1.3 cm. long, the upper ones shorter; heads globose, about 6 mm. wide, few, racemose or congested at the apex of the stem; bractlets ovate, almost 3 mm. long, acuminate at the apex, strigose-canescent on the back, closely imbricate, equaling the corolla; flowers functionally of two sexes; calyx densely spreading-lanate, almost equaling the corolla; corolla very small, yellow, hypocrateriform, its tube straight, slightly ampliate above, lightly puberulent in the throat, the limb very short, oblique, the lobes subequal, rounded.

This species was based by Chamisso on several collections made by Friedrich Sellow (nos. 1698 & 3260) in southern Brazil and deposited in the herbarium of the Botanisches Museum in Berlin, where they were photographed by Macbride as his type photograph number 17514, but are now destroyed. The type of L. alegrensis was collected by Eduard Martin Reineck and Josef Czermak (no. 66) at Porto Alegre, Rio Grande do Sul, Brazil, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques in Geneva; an isotype in the Munich herbarium was photographed by Macbride as his type photograph number 20320. The binomial appears as "Lippia alegrensis Briq. sp. nov." on the printed labels. Augusto (1946) says "segundo Bornmueller encontra-se a mesma espécie [L. hieracifolia] no herbario de

Reineck e Czermack sob Lippia alegrensis Briq.....Rio Grande do Sul, campos arbustivos 'forma proxima a Verbena: littoralis e bonariensis' confere com Lippia hieracifolia."

Schauer (1847) places the species in Section Zapania, Subsection Paniculatae. It has been found growing in bushy or shrubby fields, dry or open campos, dry grassy campos and grassy places in general, at an altitude of 200 meters, flowering from November to February and in May. Rambo encountered it in a region of 1.5 meters rainfall and a temperature variation of 5--35 degrees. Material has been misidentified and distributed in herbaria as Neosparton sp. and Verbena sp. On the other hand, the Pedersen 4326 distributed as L. hieracifolia is actually L. angustifolia Cham. The Leite 245 collection cited below is marked "Eugenio 245" on the original label, but was collected by Padre José Eugenio Leite.

Augusto (1946) cites an unnumbered Herter collection from Rivera, Uruguay, and one of Borrmüller from "Pôrto Alegre, Tristeza, nos prados". In all, 30 herbarium specimens and 11 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: BRAZIL: Rio Grande do Sul: Costa Sacco 331 [Herb. Hort. Bot. 1068] (N); Emrich 28682 (Rb), s.n. [Herb. Herter 96646] (N); Leite 245 (N); Lindman A.1187 (N, S); Malme 590 (S), 590a (S); Moldenke & Moldenke 19687 (N); Rambo 9145 (Rb), 27010 (S), 38681 (N), 51343 (W--2102004); Reineck & Czermak 66 [Macbride photos 20320] (Kr--photo, N--photo, S, W--photo). State undetermined: Sellow 1698 [Brasil meridionali; Macbride photos 17514, in part] (Kr--photo of cotype, N--photo of cotype, W--photo of cotype), 3260 [Brasil meridionali; Macbride photos 17514, in part] (Kr--photo of cotype, N--photo of cotype, W--photo of cotype). URUGUAY: Arechavaleta 13 (Cb, N--photo, Ug, Z--photo), s.n. [Tacuarembo, Nov.] (Ug); Herb. Herter 94103 (N); Legrand 3963 (Ug), 4128 (Ug); Pintos s.n. [Herb. Osten 3749] (Ug). ARGENTINA: Corrientes: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 34483] (N). Misiones: Ekman 2009 (N, S), 2010 (S); D. Rodriguez 773 [Herb. Inst. Miguel Lillo 31582] (N); Ruiz Huidobro 5301 (N, Si), 5556 (N); E. J. Schwarz 3959 (N).

LIPPIA HIRSUTA L. f., Suppl. Pl. 288. 1788.

Synonymy: Lippia hirsuta Mutis ex Spreng. in L., Syst. Veg., ed. 16, 2: 752. 1825. Lippia sphacelifolia Benth., Pl. Hartw. 245. 1846. Lippia hirsuta β sphacelifolia (Benth.) Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898. Lippia hirsuta L. ex Moldenke, Résumé Suppl. 9: 4, in syn. 1964.

Bibliography: L. f., Suppl. Pl. 288. 1788; Spreng. in L., Syst. Veg., ed. 16, 2: 752. 1825; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 599. 1843; Walp., Repert. Bot. Syst.

4: 54. 1845; Benth., Pl. Hartw. 245. 1846; Schau. in A. DC., Prodr. 11: 580. 1847; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 32, 95, & 96. 1942; Moldenke, Alph. List Cit. 1: 131--135, 194, & 222. 1946; Moldenke, Phytologia 2: 334. 1947; W. H. Hodge, Revist. Fac. Nat. Agron. 7: 313. 1947; Daniel, Verbenac. Cent. Antioq. 4. 1947; Moldenke, Alph. List Cit. 2: 352, 410, & 611 (1948), 3: 974 (1949), and 4: 1001, 1074, 1078, & 1215. 1949; Moldenke, Phytologia 3: 141. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 60, 63, 162, & 190--191. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Résumé 67, 71, 220, 461, & 462. 1959; Moldenke, Résumé Suppl. 8: 1, 4, & 5 (1964) and 11: 4, 5, & 7. 1964; Moldenke, Biol. Abstr. 45: 7026. 1964; Moldenke, Phytologia 12: 23 & 77. 1965.

Shrub or small tree, 1--16.5 m. tall, hirsute, with spreading top and good wood, the trunk 10--25 cm. in diameter; bark gray, rough, much fissured, shreddy, cracking off in thick plates; stems tetragonal; branches somewhat drooping, tetragonal, canescent-hirsute; leaves decussate-opposite, petiolate, harsh, pleasantly scented; petioles short, about 1.2 cm. long; leaf-blades firmly chartaceous or papyraceous, dark-green above, dull- or light-green beneath, usually nigrescent in drying, oblong or broadly oblong to oblong-lanceolate, 7.5--13 cm. long, 2.5--4 cm. wide, acuminate at both ends, serrate or serrate-crenate along the margins, cuneate or attenuate into the petiole at the base, bullate and reticulate-rugose and pilose or pilose-hirtous to hirtous above, usually densely tomentose or tomentose-pubescent and incanous or subcanescent beneath, especially hirsute on the prominent buff venation; inflorescence axillary and subequaling the leaves or terminal and elongated into a branched fastigiate many-headed panicle, the axillary ones single or paired, unequal, and longer pedunculate; peduncles short, axillary, numerous, canescent-hirsute; pedicels about 1.2 cm. long, dull pale-green; heads pedicellate, hemispheric or ovate to subglobose or depressed, in clusters of 2 or 3, large, the size of a large pea [Pisum sativum], 6--8 mm. wide, very densely canescent-hirsute or softly villous, subtended by a pair of small bracts; bractlets membranous, light-green or dull pale-green, ovate or broadly ovate to broadly rhomboid, small, stipitate, slightly shorter than or equaling the flowers, imbricate, acute to very short-acuminate or obtuse at the apex, cuneate at the base, hirtellous on the back, long-ciliate along the margins, the larger ones about 5 mm. long and wide; flowers minute; calyx bifid, compressed, about 2 mm. long, slightly shorter than the corolla, bifariously lanate or very pilose, the hairs on the keel greatly surpassing the margins of the bractlets, ciliate at both ends, with a glabrous anterior disk, the anterior side deeply bifid, the posterior side split to below the middle, the lobes carinate, entire or 2-dentate at the apex, densely long-pilose on the back; corolla very small, hypocrateriform or funnelform, white, scarcely more than 2 mm. long, the tube

short, scarcely surpassing the calyx, green within, lightly pilosulous at the apex on the outside, the throat broad, the limb 4-lobed; filaments short, inserted in the corolla-throat; fruit obovate, shorter than the mature calyx, compressed, 2-parted, smooth; cocci coherent.

The type of this puzzling species was apparently collected by José Escallón (no. 4) in Antioquia, Colombia, but was transmitted to the younger Linnaeus by Mutis and is deposited in the herbarium of the Linnaean Society in London. The type of L. sphacelifolia was collected by Carl Theodor Hartweg (no. 1354) "prope Pagum Pacho" near Bogotá, Cundinamarca, Colombia, and is deposited in the Bentham Herbarium at the Royal Botanic Gardens, Kew. I am not completely certain that my interpretation of L. hirsuta and its synonymy is the correct one. The type should be re-examined and compared with the types of L. sphacelifolia Benth., L. moritzii Turcz., L. schlimii Turcz., and the taxa whose names are given in their synonymy. It should be noted here that the L. hirsuta α vernonioides (Cham.) Kuntze and L. hirsuta f. vernonioides (Cham.) Kuntze are synonyms of L. vernonioides Cham., a distinct species, while L. hirsuta var. glabrescens Moldenke is now regarded as L. schlimii var. glabrescens (Moldenke) Moldenke.

The original description of L. hirsuta by the younger Linnaeus is: "Hirsuta, foliis oblongis latis rugosis serratis subtus tomentosis, paniculis axillaribus, capitulis ovatis. Habitat in America. Mutis. Caulis tetragonus, hirsutie canus. Folia opposita, petiolata, oblonga, longa, serrata, rugosa, supra pilosa, subtus tomentosa cana. Pedunculi axillares, plures, elongati in paniculam, ramificantes. Pedicelli terminantes in capitula ovata, bracteis binis suffulta. Flores minuti, albi." Bentham (1846) says of his L. sphacelifolia: "Affinis L. vernonioidi Cham. et L. callicarpaefoliae, Humb. & Kunth."

Schauer (1847) places L. hirsuta in Section Dipterocalyx. He includes Lippia pallescens Benth. in its synonymy, based on Hartweg 1355 from Bogotá, Cundinamarca, Colombia, but I cite this binomial in the synonymy of Lantana canescens H.B.K. He cites only this collection and Hartweg 1354 for L. hirsuta.

Cuatrecasas describes our plant as "fruticuletum bejucoso; hoja verde grisacea o verde amarillente; corolla blanca". It has been collected in woods and rich woods, forests, plantation forests, and mountain rainforests, thickets, fields, meadows, open canyon bottoms, and small ravines, as well as on open hillsides, at altitudes of 200 to 3750 meters, flowering from July to November and from January to March, fruiting in January, July, and September. Cuatrecasas describes it as "abundant" in Boyacá; Kernan calls it "dominant in crown class, southwest exposure" in Magdalena. Ewan found it "frequent in thickets along borders of monte; shrub 2 m. tall, very odorous with scent of Verbena citriodora but habit of Hyptis". The Littles call it a "Disturbed paramillo shrub type

and dwarf forest" species. Daniel (1947) says "se encuentra con cierte frecuencia en las arboledas rezagadas que han escapado al golpe del hacha de estos alrededores; he coleccionado ejemplares en San Cristóbal, La Ceja, Cocorná." The records from Caldas, Valle del Cauca, and "cultivated" given by me in previous publications appear to apply only to L. schlimii var. glabrescens, and not to L. hirsuta.

A simple key for distinguishing L. hirsuta from related taxa may be written as follows:

1. Heads large; leaf-blades densely tomentose or tomentose-pubescent beneath.....L. hirsuta.
1a. Heads small.
  2. Leaf-blades ovate, very decidedly bullate, tomentose beneath.....L. moritzii.
  2a. Leaf-blades elliptic, not decidedly bullate.
    3. Leaf-blades glabrescent beneath, narrow-elliptic; inflorescence not especially ample.L. schlimii var. glabrescens
    3a. Leaf-blades densely pubescent beneath, broadly elliptic; inflorescence very ample.....L. schlimii.

Common names recorded for L. hirsuta are "gallinazo", "salvia", and "salvio blanco". Material has been misidentified and distributed in herbaria under the names L. briquetii Moldenke, L. floribunda H.B.K., L. moritzii Turcz., Buddleia sp., Hyptis sp., and Verbesina sp. On the other hand, the Archer 267 & 1110, Cuatrecasas 20471, Gehriger 337, Gutiérrez Villegas 1093, W. H. Hodge 6744, Killip, Barkley, & Daniel 39841, Killip & Smith 16982, F. C. Lehmann 898 & 3137, F. W. Pennell 8891 & 8922, Steyermark 57271 & 57469, and Toro 865 & 1281, distributed as L. hirsuta, are all L. schlimii var. glabrescens (Moldenke) Moldenke, while Allart 85, 176, & 288a, Bailey & Bailey 994, Cuatrecasas 1863 & 13572, Delgado 54, Eggers 13580, Fendler 863, Jahn 1140, H. Pittier 9869, 9870, 9966, & 13779, and Seifritz 397 are L. moritzii Turcz., and Bourgeau 1217 is L. pringlei Briq.

Hodge (1947) cites an "Arcehr 267" from Antioquia, but this is a typographic error for Archer 267, which is L. schlimii var. glabrescens, as are all the other specimens which he cites.

In all, 50 herbarium specimens, including type material of all the names involved, and 2 mounted photographs have been examined by me.

Citations: COLOMBIA: Antioquia: Cuatrecasas & Willard 26230 (W); Escallón 4 [Herb. Linnaeus G.801, S.3] (Ls--type, N--photo of type, Z--photo of type); Hathaway 1769 (B); W. H. Hodge 65-28 (Fn). Boyacá: Ariste-Joseph A.293 (W--1040021); Cuatrecasas 1157 (W--1772897), 1269 (W--1772933), 1795 (Jc), 1797 (W--1796841), 1864 (W--1773189), 10398 (W--1796491); F. R. Fosberg 22193 [U. S. Nat. Arb. 282611] (N, W--2165646); Grubb, Curry, & Fernandez-

Perez 696 (W--2322607). Cundinamarca: Ariste-Joseph A.239 (W--888448), s.n. [near Bogotá] (W--1124897), s.n. [region of Bogotá] (W--1040085); Cuatrecasas 152 (W--1772761), 8208 (Jc), 13572 (N, W--1851400); Cuatrecasas & Jaramillo 12003 (W--1850854); Ewan 16922 (W--2106341); F. R. Fosberg 20618 [U. S. Nat. Arb. 282618] (Ca--43611, W--2165477); García y Barriga 11011 (N); Hartweg 1354 (N); Haught 5923 (W--1903270); Huertas & Camargo 1259 (W--2250951); Little & Little 9228 (N, N, W--2140905), 9795 (N, W--2141146); F. W. Pennell 2462 (N, W--1042309); Triana 2049 (W--1481365). Magdalena: Cuatrecasas & Castañeda 24688 (Z), 24717 (Fg); Kernan 163 (W--2107169). Norte de Santander: Cuatrecasas & Garcia Barriga 10279 (W--1799492); Garganta Fábrega 702 (F--1292053). Santander: Killip & Smith 16885 (N, S, W--1352573), 18757 (N, W--1354115). Department undetermined: Herb. Mus. Paris 1 (N, S); Triana 148 (N, W--1480731). VENEZUELA: Mérida: Gines 1587 (W--2048533).

LIPPIA HIRTA (Cham.) Meisn. ex D. Dietr., Syn. Pl. 3: 599. 1843.

Synonymy: Dipterocalyx hirtus Cham., Linnaea 7: 241--242, pl. 7, fig. D. 1832. Dipterocalyx glabrescens Cham., Linnaea 7: 242--243. 1832. Lippia glabrescens Meisn. ex D. Dietr., Syn. Pl. 3: 599. 1843. Lippia hirta Meisn. ex Walp., Repert. Bot. Syst. 4: 56. 1845. Lippia glabrescens (Cham.) Meisn. ex Walp., Repert. Bot. Syst. 4: 56. 1845. Lippia hirta Schau. in Mart., Fl. Bras. 9: 230. 1851. Lippia glabrescens Cham. & Schl. ex Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 2: 821 [as "glabrescente"]. 1902. Lippia hirta Cham. ex Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 305, in textu. 1904. Lippia glabrescens Cham. ex Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 305, in textu. 1904. Lippia hirta (Cham.) Schau. ex Moldenke, Alph. List Invalid Names 31. 1942.

Bibliography: Cham., Linnaea 7: 241--243. 1832; D. Dietr., Syn. Pl. 3: 599. 1843; Walp., Repert. Bot. Syst. 4: 56. 1845; Schau. in A. DC., Prodr. 11: 579. 1847; Schau. in Mart., Fl. Bras. 9: 230--231, pl. 37, fig. 2. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 305. 1904; Stapf, Ind. Lond. 4: 125. 1930; Moldenke, Suppl. List Invalid Names 3 & 5. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Invalid Names 23 & 31. 1942; Moldenke, Alph. List Cit. 1: 171 & 172. 1946; Moldenke, Castanea 13: 116. 1948; Moldenke, Alph. List Cit. 2: 445 (1948), 3: 689, 704, 705, & 921 (1949), and 4: 1248--1251. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Stellfeld, Trib. Farmac. 19 (10): 168. 1951; Angely, Fl. Paran. 7: 12. 1957; Moldenke, Résumé 93, 278, 313, & 461. 1959; Angely, Fl. Paran. 16: 60 (1960) and 17: 46. 1961; Troncoso, Darwiniana 12: 263. 1961; Moldenke, Résumé Suppl. 8: 4 (1964), 10: 5

(1964), and 11: 4, 6, & 7. 1964; Moldenke, Phytologia 12: 23 & 151. 1965.

Illustrations: Cham., Linnaea 7: pl. 7, fig. D. 1832; Schau. in Mart., Fl. Bras. 9: pl. 37, fig. 2. 1851.

Shrub, about 0.5 m. tall; stems strict, suffruticose, woody at the base, subterete, hirsute-pilose with spreading hairs that are conic-callose at the base, finally merely asperous, subsimple or with a few erect branches above, floriferous at the apex; principal internodes 4--5 cm. long, the upper ones longer; leaves decussate-opposite, ternate, or verticillate, subsessile, spreading-erect; leaf-blades thick and stiff, ovate-elliptic, acute at the apex, serrate and revolute along the margins, obtuse and entire at the base, lineate and more or less rugose between the veins above, shiny and more or less callose-hirtous (at the base of the teeth) above, finally very scabrous, glaucescent and shiny beneath, hirsutulous on the venation, finally glabrescent, penninerved, often 3-plinerved at the base, the lower ones 4--5 cm. long and about 1.8 cm. wide and equaling the internodes, the upper gradually smaller and more distant, those beneath the flowers minute, the venation prominent beneath; inflorescence terminal, verticillate-racemose, the lower whorls distant, the upper ones approximate, the uppermost ones confluent; peduncles axillary, single or paired, about 1.2 cm. long, somewhat spreading, scabrous-hirtous; heads small, about 1.3 cm. long, oblong, later becoming subcylindric, 6-ranked, squarrose; bractlets 6-ranked, imbricate, concave, spreading, about 3 mm. long, as wide as the calyx, squarrose, rather thick, broadly ovate, varying from subobtuse or subacute to acute or subacuminate at the apex, shiny, scabrous on the back, spinulose on the margins, sub-trinerved; calyx compressed-tubular, slightly shorter than the bractlets, shortly 2-fid, puberulent, carinate-winged on both sides, the wings sublenticular-disciform and long-villous-ciliate, the hairs surpassing the bractlets on both sides, the lobes rounded and emarginate at the apex; corolla white, exserted, about 4 mm. long, puberulent above on the outside, its tube infundibular or subinfundibular, straight, villosulous in the throat, its limb small, 4-parted, the lobes obtuse at the apex, the upper ones 2-parted, the lowest one somewhat larger and incurved; stamens didynamous, inserted at the middle of the corolla-tube; anthers subsessile; style very short; stigma terminal, subpeltate-capitate; ovary glabrous; fruit chartaceous, ellipsoid or (when mature) ovoid, rather turgid throughout, smooth, covered by or even partly hidden by the entire non-adherent fruiting-calyx, compressed at the apex, with a very shallow channel between the cells, the cocci not easily separating.

The type of this species was collected by Friedrich Sellow somewhere in southern Brazil and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17515, but is now destroyed. Chamisso (1832) says merely "E Brasilia misit Sellow". The type of Dipterocalyx glabrescens is similarly designated by him: "Semel iterumque lectam e Brasilia misit Sellowius". Schauer (1851) says of L. hirta: "In Brasilia loco ignoto, plantam certo raram

legit Sellow." He places the species, of course, in his Section Dipterocalyx and says "Verticillus inferior unus alterve nonnumquam pedunculorum loco ramulos floriferos emittit." He also comments that "Dipterocalyx glabrescens Cham. l. c. quod examine specimimum authenticorum in herb. Reg. Berol. edoctus sum, ejusdem plantae exhibet individua aetate magis provecta, deflorata, loco forte magis umbroso enata indumento rariori minusque hirto, foliis tenuioribus substantiae atque minus rugosis, bracteis parum per acutioribus."

Regarding the validity of Dipterocalyx as a genus, Troncoso (1961) says: "Lippia hassleriana pertenece a la sección Dipterocalyx (Cham.) Schauer a causa de su cáliz 2-alado, con alas largamente ciliadas. Este carácter considerado por Chamisso de gran valor taxonómico, pues le sirvío para crear el género Dipterocalyx .....no fue correctamente interpretado por su autor. Según la ilustración dada por Chamisso, las alas aparecen como un simple repliegue del cáliz, por en contrario se trata de dos alas membranosas, vesiculosas. Esta cáliz vesiculoso es probablemente un medio de diseminación ya que las semillas en su madurez permanecen encerradas par el mismo. Igual tipo de cáliz presente L. hirta (Cham.) Sch.....y L. sclerophylla Briq."

Some authors imply that the combination, Lippia hirta, was made by Meisner in his Gen. Pl. Vasc. 2: 199 (1839), but it actually was not made there. It is also sometimes cited to a "Meissn., Comment. 242", which I have as yet not been able to trace.

The species has been collected on campos, dry or grassy campos, fields, sandy riverbanks, and moist campos at the edge of woods, in campo-like openings in woods, and near streams, at an altitude of 800 meters, flowering from December to March, fruiting in January. Material has been misidentified and distributed in herbaria as Verbena sp. On the other hand, the Mendes Magalhães 1768, distributed as L. hirta, is actually the type collection of L. violacea Moldenke.

In all, 26 herbarium specimens and 3 mounted photographs, including phototypes of most of the names involved, have been examined by me.

Citations: BRAZIL: Paraná: Braga & Lange 180 (Gg, N, W--2369346), 259 (Bm, Gg, W--2369349); Dusén 36 (S), 2600 (S), 7344 (W--1481649), 7344a (S), 16263 (Ca--501677, N, S), 17588 (S, W--1481650), s.n. [Herb. Rio Jan. 31522] (N), s.n. [Lago, March 7, 1904] (S), s.n. [Villa Velha, March 13, 1904] (S), s.n. [12.3.1904] (I); Hatschbach 2904 (N), 5397 (Mm); Tessmann s.n. [Herb. Mus. Paran. 2838] (N). Rio Grande do Sul: Malme 1152 (S), s.n. [Cruz Alta, Jan. 21, 1902] (S). Santa Catarina: Smith & Klein 10672 (Z). State undetermined: J. F. T. Müller 144 (P); Sellow s.n. [Brasilia; Macbride photos 17515] (Kr--photo of type, N--photo of type, W--photo of type).

LIPPIA HISPIDA Good, Journ. Bot. 68: Suppl. 2: 139--140. 1930.

Bibliography: Good, Journ. Bot. 68: Suppl. 2: 139—140. 1930; A. W. Hill, Ind. Kew. Suppl. 8: 137. 1933; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 51 & 95 (1942) and [ed. 2], 119 & 190. 1949; Moldenke, Résumé 147 & 461. 1959.

Perennial glandular-hispid herb; stems angular, about 1 mm. thick, densely hispid-hirsute; leaves subsessile, the blades elliptic-lanceolate or lanceolate, to 7 cm. long and 3 cm. wide, dentate along the margins, rugose-hispid above, paler and hispid beneath, the venation impressed above, prominent beneath, the secondaries about 8 pairs, a few pairs issuing from the leaf-base; inflorescence long-pedunculate; peduncles about 5 cm. long, somewhat shorter than the leaves, hispid; heads small, about 1 cm. long; bractlets ovate, about 5 mm. long, mucronate-acute at the apex, hispid-pubescent on the outer surface; calyx 0.5—1 mm. long, minutely pubescent, the tube obsolete, the lobes 2, much shorter than the corolla-tube, rounded; corolla hypocrateriform, pale-yellow, turning white in age, the tube subcylindric, 2.5--3 mm. long, slightly constricted at the base, subglabrous on the outer surface, the lobes 4, minute, spreading, rounded, pubescent on the outside; anthers sessile, rounded-oval: style filiform, 1.5—2 mm. long, about half as long as the corolla-tube, subcapitate at the apex.

The type of this poorly known species was collected by John Gossweiler (no. 2362) in rocky short thickets about the Fte. P. Amelia, Cubango, Angola, flowering in December. The plant is said to have been common in the type locality and to be "Very closely allied to L. Wilmsii H. H. W. Pearson, but differing in the shape of the leaves, the much coarser hairiness, the shape of the bracts, and other minor characters." The species is known to me only from the original description.

LIPPIA HOEHNEI Moldenke ex F. C. Hoehne, Resen. Hist. Comm. Viges. Anniv. Secc. Bot. Agron. Inst. Biol. S. Paulo 153, hyponym (1937); Moldenke, Phytologia 1: 467—468. 1940.

Bibliography: F. C. Hoehne, Resen. Hist. Comm. Viges. Anniv. Secc. Bot. Agron. Inst. Biol. S. Paulo 153 & 161. 1937; Moldenke, Phytologia 1: 467—468 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Phytologia 2: 67 & 107. 1945; Moldenke, Alph. List Cit. 1: 121. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 64. 1948; Moldenke, Alph. List Cit. 2: 552 (1948) and 3: 704 & 705. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 348. 1951; F. C. Hoehne, Relat. Anual Inst. Bot. S. Paulo Sept. 1951: 139. 1952; Moldenke, Résumé 93 & 461. 1959.

Perennial herb or shrubby, to 1.7 m. tall; branchlets and twigs slender, ascending, buff-colored, densely puberulent throughout with very short erect brownish hairs; nodes annulate; leaves decussate-opposite, sessile, clasping at the base; leaf-blades sub-

orbicular, 3—6 cm. long and wide, rounded (in outline) at the apex, cordate at the base, regularly serrate along the margins from the base to the apex with appressed and bluntish teeth or simuate below, the very apex often marked with a sharply acute or acuminate tooth, minutely puberulent and nitidulous above, rather densely spreading-pubescent on the whole venation beneath; midrib, secondaries, and the vein and veinlet reticulation subimpressed above, very prominent and conspicuous beneath in a beautiful reticulum; inflorescence axillary and terminal, clustered in a dense panicle at the tips of the branches, the inflorescence-branches erect or ascending, conspicuously bracteate; bracts large, ovate, sessile, entire or serrate, acute at the apex; heads dense, short-pedunculate, crowded.

The type of this handsome species was collected by my good friend, Frederico Carlos Hoehne (Com. Rondon 2177) — in whose honor it is named — at Trés Jacús, Matto Grosso, Brazil, in 1908, and is deposited in the herbarium of the Instituto Botanico at São Paulo, Brazil. The species has been found in sandy cerrado and in sandy places in less dense cerrado, flowering in June and July. A vernacular name recorded for it is "atiaci".

Dr. Hoehne has stated to me that his Com. Rondon 1918 also represents this species. It was deposited in the herbarium of the Botanisches Museum at Berlin, but is now destroyed. In all, 13 herbarium specimens, including the type, and 6 mounted photographs have been examined by me.

Citations: BRAZIL: Matto Grosso: F. C. Hoehne, Com. Rondon 1873 (N), 1949 (Sp—31987), 2177 [334; 344] (B—isotype, N—isotype, N—photo of type, Sp—type, Z—photo of type); Malme 1748b (N, S, S), 2004 (N, S, S), 3459 (F—photo, N, N—photo, S, Si—photo, Z—photo).

LIPPIA HYPOLEIA Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 236—237. 1900.

Synonymy: Lippia myriocephaloides Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 235—236. 1900. Lippia hypoleuca Briq. ex K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902. Buddleia bracteolata Kränzl., Bull. Jard. Bot. Petersb. 13: 90—94. 1913. Buddleja bracteolata Kränzl. ex Moldenke, Résumé 240, in syn. 1959.

Bibliography: Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 235—237. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Kränzl., Bull. Jard. Bot. Petersb. 13: 90—94. 1913; Prain, Ind. Kew. Suppl. 5: 36. 1921; C. L. Lundell, Carnegie Inst. Wash. Publ. 478: 45, 75, 135, 137, 183, 194, & 203. 1937; Moldenke, Alph. List Common Names 10 & 29. 1939; Moldenke, Suppl. List Common Names 14. 1940; Moldenke, Prelim. Alph. List Invalid Names 31. 1940; Moldenke, Carnegie Inst. Wash. Publ. 522: 164, 168—169, 219, & 221. 1940; C. L. Lundell, Contrib. Univ. Mich. Herb. 8: 61. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20, 21, & 95. 1942; Moldenke, Alph. List Invalid Names

31. 1942; Moldenke, Phytologia 2: 107. 1945; Moldenke, Alph. List Cit. 1: 5, 32, 33, 38, 53, 194, & 246. 1946; Moldenke, Phytologia 2: 330 & 384. 1947; Moldenke, Alph. List Cit. 2: 327, 329, 335, 467, 468, & 607 (1948), 3: 676, 677, 697, 714, 757, 787, 829, 830, 833—835, 842, 946, & 973 (1949), and 4: 1013, 1180, 1227, 1244, 1294, & 1295. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35, 36, & 190. 1949; F. Miranda, Veg. Chiapas 1: 287-288 (1952) and 2: 363. 1953; Moldenke, Résumé 37, 42, 43, 240, 315, & 461. 1959; F. Miranda, Bol. Soc. Bot. Mex. 26: 143 & 148. 1961; Moldenke, Résumé Suppl. 3: 11 (1962), 4: 4 (1962), and 8: 4. 1964; Moldenke, Phytologia 12: 111. 1965.

Shrub or large shrub to small or tall tree, 3—16.5 m. tall, sometimes only treelike; stem to 15 cm. in diameter, not white; branches and branchlets tetragonal, often sharply angled and the angles short-aculeate, densely hirsute-tomentose when young, less so in age, not white; twigs slender, subterete or more obtusely tetragonal, unarmed or with only a few scattered and minute aculeations, densely short-pubescent or hirsute-tomentose with cinereous or subfuscous hairs; leaves decussate-opposite, with a fetid odor, petiolate; petioles 4—10 mm. long, appressed-pubescent or strigose; leaf-blades chartaceous or submembranous, dark-green and somewhat shiny above, paler beneath, elliptic or ovate-elliptic to oblong-lanceolate, 8—15 cm. long, 3—5 cm. wide, acuminate or mostly long-attenuate or more rarely abruptly acute at the apex, regularly but rather obscurely crenulate along the slightly revolute margins (except at the base) with greatly appressed teeth, cuneately contracted into the petiole at the base, subscabridous above with short rigid hairs, varying from appressed-short-pubescent along the venation beneath to densely and uniformly softly cinereous-tomentose, mostly densely velutinous beneath when young; inflorescence cream-color; peduncles very slender, 3—8 or more in each leaf-axil, 1—3 cm. long, densely short-pubescent or hirsutulous-tomentose, often a much more elongate one among them with a secondary umbel of 4—8 pedunculate heads or a twig with several abbreviated bract-like pairs of leaves and clusters of short-pedunculate heads; heads small, conglobate, subspherical, 2—3 mm. in diameter, to 5 mm. long; bractlets membranous, broadly ovate, subreniform in age, veiny, short-acuminate at the apex, finally more or less reflexed, short-ciliate, not conduplicate nor carinate, many-ranked, not attenuate nor widely divergent at the apex, the lowermost also densely short-pubescent on the back, equaling or surpassing the corollas; calyx small, about 0.5 mm. long, shortly 2-lobed, villous; corolla very small, white, light cream-color, or deep cream-color to pale-yellow or yellow, its tube several times longer than the calyx, hirtellous on the outside.

This interesting species was based by Briquet on two collections made by Henri Guillaume Galeotti — (1) no. 752 in hedges and woods at 3000 feet altitude in the Cordillera of Vera Cruz, and (2) no. 770 at 4000 feet altitude in Oaxaca, Mexico, deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques in Geneva. The type of L. myriocephaloides, which may, per-

haps, be worthy of varietal rank, was collected by Cyrus Guernsey Pringle (no. 3277) in Tamasopo Canyon, San Luis Potosí, Mexico, in September, and is deposited in the same herbarium. Briquet (1900) maintains that L. hypoleia differs from L. myriocephala Schlecht. & Cham. in being "mais distinct.....par ses rameaux tomenteux-hirsutes et les feuilles veloutées à la face inférieure." Also, I find that it produces more secondary umbels. In the past, however, it has been confused almost uniformly with L. myriocephala, of which it may possibly be only a pubescent variety. C. L. Smith 1076 seems to represent an intermediate form, but its young leaves, at least, are canescent-pubescent beneath. Lundell (1937) regarded it as L. myriocephala.

The type of Buddleia bracteolata was collected by Freiherr Wilhelm Friedrich von Karwinski von Karwin (no. 696) somewhere in Mexico, and is deposited in the Fischer Herbarium at Leningrad.

Lippia hypoleia has been found growing in forests and open woods, canyons, moist localities, secondgrowth and secondgrowth on cohune ridges, and mixed woods with pines, along gypsum cliffs on lakeshores, on hills and hilltops, steep slopes bordering barrancas, and steep rocky sparsely wooded slopes, at altitudes of 1500 to 4800 feet, flowering from November to May and July to September, and fruiting from December to May. In the Yucatán Peninsula it is said to inhabit marginal scrub forests around savannas and secondgrowth. Lundell describes it as "common around savannas in marginal scrub forest" and as a prominent tree in the scrub forests overrunning savannas and a common small tree in young secondary upland forests. McVaugh found it on steep mountainsides and barrancas in fir forests with Pinus, Ostrya, Cornus, Meliosma, and Podocarpus in Jalisco. Lundell refers to it as "a common tree" and a "common pioneer tree" in Guatemala. Palmer describes it as "very ornamental" and as a "small ornamental tree". His no. 1137, cited below from San Luis Potosí, was actually gathered "En route from San Luis Potosí to Tampico". A note appended to the Purpus 8648 collection says "rare, only one tree; leaves entire and more glabrous", but it is not certain that this comment actually applies to that collection.

The corollas are described as "white" on Bartlett 11503 and Galeotti 752, "light cream-color" or "deep cream-color" on Edw. Palmer 1137, "pale-yellow" on Dressler & Jones 190, and "yellow" on Mc Vaugh 21511.

Vernacular names recorded for this plant are "corazon amarillo", "corazón amarillo", "cutujume", "maste", "palo de gusano", "sacmumús", "sacmumutz", "siguinay blanco", "tabaquillo", "tah", and "tamesagua". The name, "tabaquillo", is, however, also applied to Aegiphila anomala Pittier, A. valerii Standl., and Lippia pringlei Briq.

Material of L. hypoleia has been misidentified and distributed in herbaria under the names L. callicarpaefolia H.B.K., L. graveolens

H.B.K., L. myriocephala Cham. & Schlecht., L. myriocephala Schlecht. & Cham., L. umbellata Cav., and Hippia graveolens H.B.K.

In all, 118 herbarium specimens and 1 mounted photograph, including type or phototype material of all the names involved, have been examined by me.

Citations: MEXICO: Chiapas: Breedlove 6201 (Ac), 7376 (Ac), 7643 (Ac); Matuda 3630 (A, N, N), 5300 (Ld). Jalisco: R. McVaugh 21511 (Mi). Oaxaca: Galeotti 770 (Br--cotype). San Luis Potosí: Kenoyer s.n. [Valles, 9-3-38] (Fs); Edw. Palmer 1137 (G, Io, Pa, Pa); Pringle 3277 (A, Br, C, Ca--104906, Cm, Es, G, Me, Me, Mi, Mm--15411, Ob--50729, Pa, Po--63854, S, Vt); J. Rzedowski 6906 (Au). Vera Cruz: Balls B.5489 (Ca--684285); Berlandier 2159 (G, T); Botteri 881 (G, G, S); Bourgeau 1471 (Br, G, S), 2983 (Br, C, G, S); Dressler & Jones 190 (Ca--48876, G, N); Ervendberg 288 (G, T); Galeotti 752 (Br--cotype); J. M. Greenman 274 (G, N); N. L. H. Krauss 858 (W--2367811); MacDaniels 354 (Ba); Pringle 11668 (Fs, G, Gg--421286, It, Me, Me, Mi, Rf, Vt); Purpus 421 (Ca--104929, Po--64306), 2254 (Du--77084, G, N, Tu), 5751 (A, Ca--163122, G, N), 8648 (Ca--208397, G, N), 14091 (A, Mi, W--1638300), 14093 (Ca--429028); C. L. Smith 1076 (Ca--975392, G, Mi, N, N, N, Tl, Vt). State undetermined: Karwinski 696 (Z, Z--photo); W. Schaffner 1 (S). GUATEMALA: Alta Verapaz: Türckheim II.1474 (S). Copán: Record & Kuylen G.90 [Herb. Mus. Yale School Forest. 10041] (N). El Petén: Aguilar Hidalgo 394 (I, Mi, N); Contreras 2034 (Ld, S); C. L. Lundell 2119 (Mi, S), 2599 (Mi, Mi), 2780 (Mi, S), 3171 (F--714093, Mi, S), 17256 (Ld, S). San Marcos: Steyermark 36722 (F--1053464). BRITISH HONDURAS: H. H. Bartlett 11503 (Du--266231, F--665423, Gg--233411, Mi), 13008 (Ca--72670, F--659101, Mi). EL SALVADOR: San Salvador: M. C. Carlson 430 (Ca--703550), 431 (Ca--703549).

LIPPIA INDICA Moldenke, Phytologia 1: 427. 1940.

Bibliography: Moldenke, Phytologia 1: 427 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 54 & 95. 1942; Moldenke, Alph. List Cit. 1: 220. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Cit. 2: 639 (1948) and 4: 1127. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 127 & 190. 1949; Razi, Rec. Bot. Surv. India 18: 31 & 34. 1959; Moldenke, Résumé 163 & 461. 1959.

Perennial herb; stems and branches slender, obtusely tetragonal, densely hirsutulous or short-pubescent, becoming more sparsely so or merely puberulent in age, the hairs whitish; nodes annulate; leaves decussate-opposite, often with fascicles of small ones on greatly abbreviated twigs in their axils, petiolate; petioles slender, 3--15 mm. long, very densely or sparsely hirsute with whitish hairs; leaf-blades chartaceous, gray-green, ovate, 0.8--7.5 cm. long, 0.6—3.5 cm. wide, obtuse at the apex, regularly

serrate from the base to the apex with extremely small and blunt somewhat appressed teeth, very bullate and rather densely strigose with appressed whitish hairs above, densely tomentulose beneath; inflorescence axillary, clustered toward the tips of the branches, spicate; spikes elongate, 2—5.5 cm. long, 1—3 in each upper leaf-axil, erect or ascending, the floriferous part 0.4—2.6 cm. long, uniformly 5—6 mm. wide throughout; peduncles very slender, 1.5—2.6 cm. long, densely short-pubescent or puberulent with whitish hairs, often binary (divided to half way down and bearing two spikes).

The type of this species was collected by James Sykes Gamble (no. 17895) at Sigué Ghát, in the Nilgiris District, Madras, India, in August, 1886, at an altitude of 3000 feet, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The species has been collected in anthesis in August and December. Material has been misidentified and distributed in herbaria as Lantana sp.

A letter to Mr. C. E. C. Fischer from the Botanical Assistant at the Government Museum, Egmore, Madras, dated March 18, 1936, speaks of the locality of collection of R. Wight 2295 and 2295bis, where this species was found in December, 1848: "Thavanampalayam is a small village in the Dharapuram taluk in Coimbatore District .....This area is very different in character from the Sigur ghat and the Anamalais which are the localities for Lippia geminata. Speaking from the climate it is quite possible that it might be a different species."

In all, 9 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: INDIA: Coimbatore: R. Wight 2295 (Le—908266-238), 2295bis (Cp, N, N, S, V). Madras: Beddome s.n. [1885] (K); Gamble 17895 (K—type, N—photo of type, Z—photo of type); Lawson s.n. [Sigúr Ghát, Nilgiris, 17/3/86] (K).

LIPPIA INOPINATA Moldenke, Phytologia 9: 7—8. 1963.

Bibliography: Moldenke, Phytologia 9: 7—8. 1963; Moldenke, Résumé Suppl. 6: 4. 1963.

Woody shrub; stems tall, woody, gray, subterete, glabrous; branchlets slender, brownish, obtusely tetragonal, villous with subappressed antrorse grayish hairs; principal internodes much abbreviated, 8—21 mm. long; leaves decussate-opposite, petiolate; petioles very short, 2—5 mm. long, densely whitish-villous with long antrorse hairs; leaf-blades subcoriaceous, rather uniformly grayish-green on both surfaces, ovate-elliptic, often falcate-conduplicate, small, 2—3 cm. long, 1—1.5 cm. wide, acute at the base and apex, coarsely serrate along the margins with antrorse sharply acute teeth, rather sparsely villous and bullate-lineate above, more densely gray-villous beneath; midrib and secondaries deeply impressed above and sharply prominent beneath; veinlet reticulation more or less subimpressed above and slightly prominulous beneath; inflorescence axillary, crowded near the apex of the twigs, equaling or slightly surpassing the subtending leaves, soli-

tary in each axil; peduncles filiform, 1.5--2.3 cm. long, densely spreading-villous; heads subglobose, yellowish, about 1.5 cm. long and wide, densely many-flowered; bractlets papery, subobtuse at the apex, densely pubescent on both surfaces.

The type of this species was collected by Howard Scott Gentry (no. 18267) in an Opuntia thicket on a rocky slope in cactus-acacia association, at an altitude of 6200 feet, Villa Nueva, Zacatecas, Mexico, on November 29, 1959, and is deposited in the C. L. Lundell Herbarium at the Texas Research Foundation in Renner, Texas. The species is known thus far only from the original collection. In all, 3 herbarium specimens, including the type, have been examined by me.

Citations: MEXICO: Zacatecas: H. S. Gentry 18267 (Ld--type, W-2301983--isotype, Z--isotype).

LIPPIA INTEGRIFOLIA (Griseb.) Hieron., Bol. Acad. Nac. Córdoba 4: 406. 1881.

Synonymy: Lippia turbinata var. integrifolia Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 19: 243. 1874. Lippia integrifolia Hieron. ex Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894. Lippia turbinata var. integrifolia (Griseb.) Hieron. ex Latzina, Lilloa 1: 189, in syn. 1937. Lippia integrifolia Griseb. ex Moldenke, Résumé 313, in syn. 1959.

Bibliography: Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 19: 243. 1874; Griseb., Pl. Lorentz. 195. 1874; Hieron., Bol. Acad. Nac. Córdoba 4: 406. 1881; Hieron., Pl. Diaph. Fl. Argent. 212, 364, 395, & 399. 1882; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Doming., Mat. Med. 117. 1928; Seckt, Fl. Cordob. 417. 1929-1930; Seckt, Rev. Univ. Nac. Cordoba 17: 89. 1930; Latzina, Trab. Inst. Bot. & Farm. Buenos Aires 54: 112. 1935; Latzina, Lilloa 1: 189. 1937; Moldenke, Alph. List Common Names 25. 1939; Moldenke, Lilloa 5: 423—424 (1940) and 8: 424. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 43 & 95. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Lilloa 10: 378. 1944; P. I. Acuña, Catalog. Fl. Catamarq. 17. 1945; Moldenke, Phytologia 2: 79, 89, & 107. 1945; Moldenke, Lilloa 12: 148. 1946; Moldenke, Alph. List Cit. 1: 73, 83, 95—97, 128, 217, & 266. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 14. 1947; Moldenke, Lilloa 14: 43. 1948; Moldenke, Alph. List Cit. 2: 368, 376, 377, 441, 442, 537, & 600 (1948), 3: 689, 804, 865, 907, & 910 (1949), and 4: 1090, 1091, 1192, & 1293. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 190. 1949; J. H. Hunziker, Revist. Invest. Agric. 6 (2): 174, 175, 183, & 192. 1952; Moldenke, Résumé 125, 313, 318, & 461. 1959; Moldenke, Résumé Suppl. 11: 7. 1964; Moldenke, Phytologia 12: 47, 61, & 101. 1965.

Woody aromatic shrub, about 1 m. tall; leaf-blades oblong-linear, about 4 mm. wide, rather obtuse at the apex, entire; corolla white or purplish-white, its tube campanulate; stamens inserted below the mouth of the corolla-tube; style excentric, widened at the apex into a unilateral stigma.

The type of this interesting species was collected by Paul Gun-

ther Lorentz on a campo near Belen, Catamarca, Argentina, where the species is described as frequent. Collectors have found it in dry rocky ground, very arid soil of matorales, along highways, on dikes and campos, and between rocks on ridges, at altitudes of 1100 to 3000 meters, flowering from December to May, fruiting in April. Jörgensen calls it abundant in alpine deserts in Catamarca. Schreiter refers to it as medicinal in Tucumán, while Hunziker (1952) says that it is used as a cardiac tonic.

The original description of this taxon is "Foliis oblongo-linearibus obtusiusculis integerrimis. -- Flos (forsan ex statu dimorpho) ab α differt corollae tubo campanulato, staminibus infra faucem insertis, stylo excentrico in stigma unilaterale dilatato. Folia 2'" lata." and is sometimes cited to page 195. Hieronymus (1881) says: "Arbusto aliado al anterior [L. turbinata Griseb.], pero bien distinto como especie. Se le atribuye las mismas propriedades que al anterior."

The corolla is described as white on Rodriguez 1441, Ruiz Leal & Roig 18894, and Venturi 6972 & 8072, and as purplish-white on Burkart 12541. Vernacular names recorded for the species are "chacha coma", "manzanillo", "inca yuyo", "polco", "poleo", "pulco", and "yerba de Inca". The name "poleo" is, however, also applied to L. affinis Schau., L. alba (Mill.) N. E. Br., and L. turbinata Griseb., while "manzanillo" is applied also to Ruprechtia corylifolia Griseb.

Material has been misidentified and distributed in herbaria as L. boliviana Rusby, a very closely related species.

It should be noted here that Latzina, Lilloa 1: 189 is cited at the Instituto Miguel Lillo as "Latzina, Index II (1937) 189".

In all, 48 herbarium specimens and 5 mounted photographs have been examined by me.

Citations: ARGENTINA: Catamarca: Cabrera 1103 (N), 1123 (N); Castillón 947 [Herb. Inst. Miguel Lillo 32002] (N, N); Hauthal s.n. [1893] (N, N); Jörgensen 1734 [Herb. Osten 11012; Herb. Inst. Miguel Lillo 31934] (Ca—195340, Ug, Vi, W—917973), s.n. [Herb. Fac. Farmacol. Inst. Bot. Buenos Aires 1734; Herb. Mus. Argent. Cienc. Nat. 23855] (N, N--photo, Sp—25779, Sp); Peirano s.n. [El Portezuelo, April 19, 1935; Herb. Inst. Miguel Lillo 32869] (N); Schreiter 10590 [Herb. Inst. Miguel Lillo 32860] (N, N, Ug); Venturi 6932 (W—1591501). La Rioja: Burkart 12541 (N), 12551 (N); Castellanos s.n. [Sierra de Olta, Feb. 3, 1940; Herb. Mus. Argent. Cienc. Nat. 33843] (N); Covas 1133 (N); Hieronymus & Niederlein 875 (Vt); A. T. Hunziker 4731 (N); F. A. Roig s.n. [Herb. Ruiz Leal 17563] (Z). Salta: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 14809] (N); D. Rodriguez 1441 [Herb. Inst. Miguel Lillo 31932] (N, N, S, W—1802581), s.n. [Herb. Mus. Argent. Cienc. Nat. 23894] (N, N); Venturi 6942 (W—1591508), 6956 (W—1591510), 6972 (S), 8072 (N, N, S). San Juan: H. H. Bartlett 20558 (W—2320128); Ruiz Leal & Roig 18894 (Ok). San Luis: Bruch

& Carette 55 (N), s.n. [Alto Pencoso, Feb. 1914] (Ug). Tucumán: Castillón 3434 [Herb. Inst. Miguel Lillo 31930 & 32620] (N, Vi); Lillo 16385 [Herb. Osten 8447] (Ug); Schreiter 1202 [Herb. Inst. Miguel Lillo 32618] (Au, N). Province undetermined: Frenguelli s.n. [Yuca-yuyu, between Chicaguela & Yanso] (N); Galander s.n. [Cuesta de Las Huertes; Macbride photos 17517] (Kr--photo, N--photo, W--photo).

LIPPIA INTERMEDIA Cham., Linnaea 7: 378--379. 1832.

Synonymy: Lippia cryptantha Schau. ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941. Riedelia intermedia Cham. ex Moldenke, Suppl. List Invalid Names 7, in syn. 1941.

Bibliography: Cham., Linnaea 7: 378--379. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; Walp., Repert. Bot. Syst. 4: 44. 1845; Schau. in A. DC., Prodr. 11: 589. 1847; Schau. in Mart., Fl. Bras. 9: 243. 1851; Lorentz, Veg. Nordeste Prov. Entre Rios, ed. 1, 15, 87, 150, & 172. 1878; Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 277. 1879; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 316. 1904; Herter, Florul. Urug. 105. 1930; Moldenke, Suppl. List Invalid Names 5 & 7. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Invalid Names 30 & 40. 1942; Augusto, Fl. Rio Grande do Sul 235. 1946; Lorentz, Veg. Nordeste Prov. Entre Rios, ed. 2, 15, 87, 150, & 172. 1947; Moldenke, Lilloa 14: 40. 1948; Moldenke, Alph. List Cit. 3: 689 & 921. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93, 305, 311, 343, & 461. 1959; Moldenke, Résumé Suppl. 10: 3. 1964; Moldenke, Phytologia 12: 24 & 87. 1965.

Perennial herb; stems suffruticose, erect or ascending from the base, simple, virgate, subterete, about 45 cm. tall, hirsute below, racemose above and glandular-pubescent as well as strigose-hirsute, foliose to the base; leaves sessile, decussate-opposite, the lowest ovate, about 5 cm. long and 1.8 cm. wide, the middle ones oblong, and the upper ones elongate-lanceolate and considerably smaller and narrower, all acute at the apex, obsoletely serrate toward the apex and revolute along the margins, hirsutulous on both surfaces, glandulose-pubescent as well as strigose-hirtous above, also pubescent beneath, lineate and scabrous above; venation prominent beneath; peduncles solitary, longer than the floral leaves, glandulose-pubescent and strigose-hirtous; heads ovoid, long-pedunculate, a few in racemose fashion at the apex of the stem, about 1.7 cm. long; bractlets ovate, herbaceous, about 6 mm. long, 1-veined, loosely imbricate, with a slender recurved acumination, surpassing the corollas, smooth and shiny on the inner surface; calyx bifid, rather wide, very villous; corolla-tube 3 mm. long, straight, slender, subequal, pubescent on the outside, the limb very exiguous, bending forwards; fruit covered by the mature calyx, obcordate, dark-brown, shiny, splitting spontaneously into 2 halves, the commissure smooth, the pericarp coriaceous.

The type of this rare species was collected by Friedrich Sellow (no. 2810) in "Brasilia meridionali", probably Rio Grande do Sul, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17518, but is now destroyed. The species inhabits campos and sandy campos, flowering in October and November, and has been collected in fruit in October.

Schauer (1847) places the species in his Section Zapania, Subsection Paniculatae. The Dusén 16736, distributed as L. intermedia, proves to be L. pumila Cham. Augusto (1946) cites a Herter collection from Rivera, Uruguay, but this has not as yet been seen by me. In all, only 1 herbarium specimen and 4 mounted photographs, which, however, include type or phototype material of all the names involved, have been examined by me.

Citations: BRAZIL: Paraná: Dusén 15735 (W--1481648). State undetermined: Sellow 2810 [Brasilia meridionali; Macbride photos 17518] (It--photo of type, Kr--photo of type, N--photo of type, W--photo of type).

LIPPIA IODOPHYLLA Schau. in A. DC., Prodr. 11: 588. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 588. 1847; Schau. in Mart., Fl. Bras. 9: 241. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Phytologia 2: 336. 1947; Moldenke, Alph. List Cit. 2: 366 & 534 (1948), 3: 670, 689, & 923 (1949), and 4: 1300. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Phytologia 12: 24 & 170. 1965.

Shrub or subshrub, to 1.5 m. tall, apparently stout, fastigiate-branched; branches thick, torulose, corky; branchlets nodose and leafless below, foliose above, strigose-hirtous; leaves decussate-opposite, crowded, short-petiolate or subsessile; leaf-blades coriaceous, sticky, patulous, cuneate-oblong, 1.2--1.8 cm. long, 6--8 mm. wide, subacute at the apex, crenate-serrulate toward the apex, entire at the base and cuneately attenuate into the petiole, 3-plinerved, with the main venation pinnate above, very densely glandulose-punctate on both surfaces, impressed-rugose and with scattered strigose hairs above, pale beneath and finally subferruginous and strigose-pubescent on the prominent reticulation; peduncles axillary, solitary, strict, equaling the subtending leaves, slightly ampliate and striate above, strigose-hirtous; heads hemispheric, about 12-flowered; bractlets submembranous, ovate to obovate-oblong, patulous, rather obtuse at the apex, inflexed, loosely imbricate, about half as long as the corolla-tube, strigose-pubescent; flowers fragrant; calyx membranous, narrow, tubular, bifid, strigose-pubescent, 4-dentate, almost half as long as the corolla-tube; corolla hypocrateriform, rose or violet, its tube about 5 mm. long, ventricose below the mouth, pulverulent-glandulose and pubescent above the calyx, the limb rather large, pulverulent-glandulose and pubescent on the back, the lobes undu-

late, velutinous on the upper surface, the upper one rounded and margined, the lateral ones ovate and bent forward, the lowest one larger, extended, subquadrate, concave, retuse, unguiculate.

The type of this species was collected by Friedrich Sellow in Minas Gerais, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17519, but is now destroyed. Schauer (1847) places the species in his Section Zapania, Subsection Axilliflorae. He says (1851) of it: "L. microcephalae quodammodo similis, sed jam foliorum figura et serratura minuta distincta."

It has been collected between stones at an altitude of 2200 meters, flowering in January, February, and April. Glaziou (1911) cites also his nos. 4158, 9542, & 16287 from the Serra dos Orgãos in Rio de Janeiro. It is probable that the "6287" cited hereinafter is his "16287".

Material of this taxon has been misidentified and distributed in herbaria as L. glandulosa Schau. In all, 7 herbarium specimens and 5 mounted phototypes have been examined by me.

Citations: BRAZIL: Minas Gerais: Sellow s.n. [Macbride photos 17519] (It--photo of type, Kr--photo of type, N--photo of type, N--photo of type, W--photo of type). Rio de Janeiro: Glaziou 3707 (Br), 6287 (Br); Sagadas-Vianna 145 (Ja), 421 (Ja), 668 (Ja). São Paulo: Löfgren s.n. [Picos dos Marins, Jan. 10, 1897; Herb. Com. Geogr. & Geol. S. Paulo 3495] (N, Sp--15659).

LIPPIA JALISCANA Moldenke, Phytologia 1: 427--428. 1940.

Bibliography: Moldenke, Phytologia 1: 427--428. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 95. 1942; Moldenke, Alph. List Cit. 1: 233. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Cit. 3: 730 (1949) and 4: 1237, 1245, & 1298. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31 & 190. 1949; Moldenke, Résumé 37 & 461. 1959.

Shrub or small tree; branches and branchlets slender, brown, tetragonal, shortly appressed-pilose, decidedly scabrous, especially on the margins; nodes annulate; principal internodes 1.5--6 cm. long; leaves decussate-opposite; petioles very slender, 4--17 mm. long, short-pilose and scabrous; leaf-blades coriaceous, rather uniformly green on both surfaces or slightly lighter beneath, lanceolate, 4--11 cm. long, 1.7--3.2 cm. wide, acute at the apex, regularly serrulate from almost the base to the apex with blunt more or less appressed revolute teeth, acute or acuminate at the base, bullate and very scabrous above, puberulent and very densely glandular-punctate beneath; midrib slender, plane or subimpressed above, prominent beneath; secondaries very slender, 8--10 per side, arcuate-ascending, impressed above, sharply prominent beneath; vein and veinlet reticulation abundant, impressed above, sharply prominent beneath; inflorescence axillary, mostly paniculate with the heads borne in secondary umbels of 3--6, rarely a few simple ones included; peduncles very slender, 2--4 cm. long, densely short-pubescent

with spreading brownish hairs; secondary peduncles 1--1.5 cm. long; heads 6--10 mm. wide in anthesis, densely many-flowered; bractlets ovate, about 3 mm. long and wide, sharply acute at the apex, densely puberulent; corolla greenish-yellow, surpassing the bractlets.

The type of this species was collected by Ynes Enriquetta Julietta Mexia (no. 1636) in an oak-clad open forest on steep slopes along the trail from Real Alto to San Sebastian, at an altitude of 2000 meters, in the Sierra Madre Occidental, Jalisco, Mexico, on February 3, 1927, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been found also on rocky ridges in oak forests at 1500 meters altitude, flowering and fruiting in February. Material has been misidentified and distributed in herbaria as L. umbellata Cav.

In all, 15 herbarium specimens, including the type, have been examined by me.

Citations: MEXICO: Jalisco: Jalisco: Mexia 1636 (A--isotype, Ca--350508--isotype, Du--195347--isotype, G--isotype, Gg--153245--isotype, La--isotype, Mi--isotype, N--type). Sinaloa: H. S. Gentry 5662 (Ak--20193, Ca--651756, Du--274087, Fs, Me, N).

LIPPIA JANGADENSIS S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 435--436. 1895.

Bibliography: S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 435--436. 1895; Durand & Jacks., Ind. Kew. Suppl. 1: 507. 1906; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 540. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 689 & 748 (1949) and 4: 1300. 1949; Moldenke, Résumé 93 & 461. 1959; Moldenke, Résumé Suppl. 11: 4. 1964.

Tall erect appressed-pubescent perennial; stems stout, subterete, fistulose, about 6 mm. in diameter above, few-branched, striate, finally scaberulous; branchlets tetragonal, scarcely fistulose, about 2 mm. in diameter; leaves decussate-opposite, subsessile; petioles not over 2 mm. long, pubescent; leaf-blades membranous to coriaceous, oblong or oblong-ovate, mostly 3--5 cm. long, 1--2 cm. wide, rather acute at the apex, entire on the lower third of the margins, more or less crenate-serrulate on the remainder; secondaries 4 or 5, the basal ones paralleling the margins, the remainder obliquely ascending, very slightly arcuate; inflorescence paniculate or else solitary and axillary, often long-pedunculate when solitary; peduncles ascending, densely pubescent, about 4 cm. long on solitary inflorescences and 2 cm. in paniculate ones; heads about 7 mm. wide; bractlets ovate or obovate, about 3 mm. long, short-acuminate at the apex, surpassing the flowers, shortly yellowish-lanate on the outer surface, smooth on the inner surface, lanate-ciliate on the margins; calyx tubular, membranous, about 1 mm. long, deeply 2-lobed, lanate, the lobes ovate, 2-veined, very obtuse; corolla hypocrateriform, white, the tube about 2.5 mm. long, incurved, attenuate below, somewhat ampliate above, short-lanate above, the throat 0.5 mm. wide, pubes-

cent, the limb with the posterior lobe entire, the anterior one elongate, 0.8 mm. long, rounded, all the lobes (except the anterior one) short-lanate on the outside, pubescent on the inner surface; stamens included, inserted 1.5 mm. above the base of the corolla-tube; anthers broadly elliptic; style more than twice as long as the ovary, incrassate above; stigma lateral, half as long as the style; ovary basal, ellipsoid, obsoletely puberulous, with a crown of short white hairs at the apex.

The type of this apparently rare species was collected by Spencer le Marchant Moore (no. 280) in thickets at Jangada, Matto Grosso, Brazil, flowering in September. An isotype was photographed by Macbride in the herbarium of the Botanisches Museum at Berlin as his type photograph number 17520, but is now destroyed.

Moore (1895) says of this species "Cum Lippiâ vernonioidi, Cham., rite componenda, cujus folia reverâ majora, firmiora, argutius dentata, spicae majores, bracteae itaque multo majores, corollas grandioris tubus longe diversus, etc."

I am not at all certain of the identification of the Glaziou collection cited below. The peduncles are only 5--8 mm. long and the heads are so woolly that they resemble a composite head. It is a mixture with L. microphylla Cham. and is so cited by Glaziou (1911). It should be noted that he collected this number at two localities, "Itabira do Campo et Biribiry", so this probably accounts for the mixture of two taxa under the same number.

In all, 1 herbarium specimen and 6 mounted photographs, including photographs of the type collection, have been examined by me.

Citations: BRAZIL: Matto Grosso: S. Moore 280 [Macbride photos 17520] (It--photo of isotype, Kr--photo of isotype, N--photo of isotype, N--photo of isotype, Ug--photo of isotype, W--photo of isotype). Minas Gerais: Glaziou 14155, in part (Br).

LIPPIA JANGADENSIS var. EITENORUM Moldenke, var. nov.

Haec varietas a forma typica speciei recedit caulibus foliisque inflorescentiisque dense longeque hispidis, foliis usqua ad 13 cm. longis 5 cm. latis crasse serratis.

This variety differs from the typical form of the species in having its stems, petioles, leaf-blades, peduncles, rachis, and flower-heads densely villous or hispid, the hairs wide-spreading on the stems, petioles, and sympodia, more appressed on the peduncles and flower-heads; the leaf-blades are to 13 cm. long on the lower parts of the stem and to 5 cm. wide.

The type of this handsome variety was collected by George and Liene Teixeira Eiten (no. 4426) -- in whose joint honor it is named -- in "chapada" on the south slope of the deep and wide brook-valley called Vão das Traíras, in the Municipio de Lorêto, "Ilha de Balsas" region, between the Rios Balsas and Paranîba, about 2 km. south of the main house of Fazenda "Morros", about 35 km. south of Lorêto, at about 300 meters altitude, Maranhão, Brazil, on April 27, 1962, and is deposited in the United States National Herbarium at Washington. The collectors note that the

plant is herbaceous, 1.5 m. long, slightly inclined, or erect and 0.5 m. tall; the flower clusters are 11 mm. in diameter; in the same clusters are flowers with all white corollas and some with golden-yellow throats. It is known thus far only from the type collection, of which I have examined 4 herbarium specimens and 2 mounted photographs.

Citations: BRAZIL: Maranhão: Eiten & Eiten 4426 (W--2445204--clastotype, W--2445205--clastotype, W--2445207--type, Z--isotype, Z--photo of type, Z--photo of clastotype).

LIPPIA JAVANICA (Burm. f.) Spreng. in L., Syst. Veg., ed. 16, 2: 752. 1825.

Synonymy: Verbena javanica Burm. f., Fl. Ind. 12, pl. 6, fig. 2. 1768. Blairia javanica (Burm. f.) Gaertn., Fruct. & Sem. Pl. 1: 265--266, pl. 56. 1788. Zapania javanica (Burm. f.) Lam. ex Poir. in Lam., Tabl. Encycl. Méth. Bot. [Illustr. Gen.] 1: 59. 1791. Verbena capensis Thunb., Fl. Cap. 96. 1800. Blairia javanica Gaertn. ex Steud., Nom. Bot., ed. 1, 111, in syn. 1821. Lippia capensis (Thunb.) Spreng. in L., Syst. Veg., ed. 16, 2: 751. 1825. Lippia javanica Spreng. ex Steud., Nom. Bot., ed. 2, 2: 54. 1841. Lippia capensis Spreng. ex Steud., Nom. Bot., ed. 2, 2: 54. 1841. Verbena javanica Burm. ex Steud., Nom. Bot., ed. 2, 2: 54, in syn. 1841. Zapania javanica Poir. ex Steud., Nom. Bot., ed. 2, 2: 54, in syn. 1841. Zappania javanica Poir. ex Steud., Nom. Bot., ed. 2, 2: 797, in syn. 1841. Verbena odorata Desf. ex Steud., Nom. Bot., ed. 2, 2: 54 & 750, in syn. 1841 [not V. odorata L'Hér., 1941, nor Meyen, 1834, nor Meyer, 1946, nor Pers., 1821]. Lippia scabra Hochst. ex F. Krauss, Flora 28: 68. 1845. Zapania javanica Lam. apud Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1248. 1895. Lantana galpiniana H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 189. 1901. Lippia asperifolia L. C. Rich. ex Pulle, Pl. Surin. 401. 1906 [not L. asperifolia Benth., 1947, nor Hochst., 1947, nor H.B.K., 1863, nor Poepp., 1832, nor Reichenb., 1828, nor A. Rich., 1801]. Zapania javanica (Burm.) Lam. ex Moldenke, Prelim. Alph. List Invalid Names 54, in syn. 1940. Lippia asperifolia var. anomala Moldenke, Suppl. List Invalid Names 5, in syn. 1941. Lantana galpingiana H. H. W. Pearson ex Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 94, sphalm. 1942. Verbena nodiflora arborescens Mart. ex Moldenke, Alph. List Invalid Names Suppl. 1: 25, in syn. 1947. Verbesina capitata Harv. ex Moldenke, Alph. List Invalid Names Suppl. 1: 28, in syn. 1947. Verbena arborescens Bojer ex Moldenke, Résumé 357, in syn. 1959. Verbena capitata Hort. ex Moldenke, Résumé 361, in syn. 1959 [not V. capitata Blanco, 1877, nor Blume, 1960, nor Forsk., 1775]. Lantana javanica Burm. f. ex Moldenke, Résumé Suppl. 3: 32, in syn. 1962. Lippia javanica Burm. f. ex Moldenke,

Résumé Suppl. 3: 32, in syn. 1962. Verbena capensis L. ex Moldenke, Résumé Suppl. 9: 5, in syn. 1964. Lantana salviflora Jacq. ex Moldenke, Résumé Suppl. 11: 7, in syn. 1964. Lippia asperifolia Marthe, in herb.

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Moldenke, Résumé Suppl. 2: 12. 1960; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Index 1960: 60. 1961; Cockbill, Rhod. Agric. Journ. 58 (3): 173--177. 1961; Moldenke, Phytologia 8: 130, 131, 134, 136, & 137 (1961) and 8: 255 & 256. 1962; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 791. 1962; Cockbill, Weed Abstr. 11 (3): 158. 1962; Moldenke, Résumé Suppl. 3: 16, 32, & 33. 1962; H. P. Riley, Fam. Flow. Pl. S. Afr. 129. 1963; Moldenke, Phytologia 9: 389 & 393 (1963) and 10: 91. 1964; Moldenke, Résumé Suppl. 8: 2, 5, & 6 (1964), 10: 5 (1964), and 11: 6 & 7. 1964; Moldenke, Phytologia 12: 24, 42, 48, 56, 57, 62, 63, 90, 97, 98, 106, & 115. 1965.

Illustrations: Burm. f., Fl. Ind. pl. 6, fig. 2. 1768; Gaertn., Fruct. & Sem. Pl. 1: pl. 56. 1788; Poir. in Lam., Tabl. Encycl. Méth. Bot. [Illustr. Gen.] 1: pl. 17, fig. 2. 1791; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): fig. 58 C & D. 1895.

Tall woody and bushy shrub, subshrub, or treelet, thin, 0.7--5 m. tall, sometimes small and compact, a small spreading or medium-sized bush, or even a shrubby spreading herbaceous perennial, erect, loosely many-branched from the base, coarsely and strongly scented or pungently aromatic throughout, the odor somewhat sour but pleasant; stems woody, terete to subangular or tetragonal, dark-purple toward the tip, striate, scabrid-pubescent, covered with short stiff whitish hairs; leaves decussate-opposite, ternate, or in 4's, short-petiolate or sessile, rough, pleasantly odorous or aromatic, the new ones appearing in early spring; leaf-blades gray-white or somewhat gray-green, oblong or oblong-lanceolate to lanceolate, 2--5 cm. long, 6--15 mm. wide, acute to subacute or obtuse at the apex, acute or subacuminate to cuneate at the base, regularly serrate to crenate-serrate or crenate along the margins from the apex almost to the base with very small appressed teeth, very rugose and scabrous or scabrid-pubescent above with very short white strigose hairs, scabrellous and densely or sparsely short-pubescent beneath with white bulbous-based hairs especially on the prominulent midrib and secondaries; venation impressed above, the primary veins 4--7 on each side, ascending, prominent beneath; inflorescence axillary, not forming terminal corymbs above the leaves, 1--4 per axil, not more than 6 per node, ternate when the leaves are ternate; peduncles 0.6--4.5 cm. long; heads small, dense, to 1.7 cm. long and 6 mm. wide at the base, at first globose, finally cylindric, elongating after anthesis and spicate, the axis pubescent; bractlets broadly ovate or obovate to slightly obcordate, 2--3 mm. long, deeply concave, 1.5--3 mm. wide, not surpassing the flowers, cuspidate or very short-apiculate to shortly and abruptly acuminate or caudate-acuminate at the apex, silky-pubescent and glandular beneath, glabrous above; flowers small, fragrant with a distinct acid smell like that of Mangifera indica; calyx 1.25--2 mm. long, subbilobed or subtruncate, compressed, densely pubescent outside, glabrous inside, the lobes shorter than the tube, subacute to obtuse or rounded at the apex; corolla hypocrateriform, white, greenish-white, or cream to yellowish-white or yellow, sometimes whitish and violet or yellow in the throat, 3--4 mm. long, scarcely surpassing the subtending bractlets, glandular-pubescent

outside on the upper part, more densely so in the lateral areas, glabrous or minutely pubescent within, the tube 1.75--2.5 mm. long, 1.5 mm. in diameter, hairy above, glabrous at the base, sometimes yellow with the limb white or purple, the posterior lobe broadly triangular, somewhat cordate at the base, smaller than the anterior one, the middle lobe of the lower lip 1--1.5 mm. wide; stamens didynamous; anthers less than 0.25 mm. long or to 0.5 mm. long; style 0.75--1 mm. long; ovary glabrous; fruit very small, light-brown, oblong, plano-convex, flattened at the commissure.

The type of this perplexing species was collected by Nicolaas Laurens Burman from cultivated material in Java, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques in Geneva. The type of L. asperifolia var. anomala is an unnumbered specimen in the Persoon Herbarium, from cultivated material gathered in France, and deposited as sheet no. 908,263--483 in the Leiden herbarium. The type of L. galpiniana was collected by D. F. Gilfillan (no. 29; Galpin 6165) at Johannisburg, South Africa. Verbena nodiflora arborescens is based on an unnumbered collection made by Carl Friedrich Philipp von Martius in the Jard. des Plantes at Paris and deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. Lantana salviflora is based on Dehn 53 from Southern Rhodesia, deposited in the Government Herbarium at Salisbury.

For Verbena capensis Thunb. the "Index Kewensis" on page 1178 says "bonariensis, Lippia asperifolia", but it cannot possible be Verbena bonariensis L. nor from Buenos Aires, Argentina. Thunberg's original description is "capensis. V. diandra spicis oblongis solitariis axillaribus hirsutis, foliis ovatis rugosis crenatis". It seems definitely to be the African plant here discussed as Lippia javanica.

There is much diversity of opinion as to whether or not this African plant is conspecific with the American L. alba (Mill.) N. E. Br. Certainly they are extremely closely related and are both apparently very variable in their characters. Steudel (1841) regarded them as distinct, while Schauer (1847, 1851) did not. In his 1821 work Steudel lists Blairia javanica as an unaccepted name and refers it to Verbena, but under the genus Verbena on page 873 of the same work he fails to list it! Schauer (1851) says "Rigoroso examine discrimen inter plantam Americanam et Africanam allud detegere non contigit, nisi quod in Africana bracteae essent magis acuminatae, flores paullo majores." Both Richter (1835) and Peterman (1840) place Verbena javanica in the synonymy of Phyla nodiflora (L.) Greene, which is certainly erroneous. Briquet (1895) says "L. asperifolia Rich.....in Brasilien, Guyana, Venezuela etc. häufig, kommt auch am Kap und längs der südöstlichen Küste Afrikas vor, wo es aber wohl eingeschleppt worden ist."

Meeuse (1942) includes under L. javanica the following names as synonyms: Verbena javanica Burm. f. [1768], Lantana alba Mill. [1768], Verbena globiflora L'Hér. [1786], Zapania odoratissima Scop. [1786], Blairia javanica (Burm. f.) Gaertn. [1788], Zapania lantanoides Lam. [1791], Zapania javanica (Burm. f.) Lam. [1791], Zapania globiflora (L'Hér.) Willd. [1797], Verbena capensis Thunb. [1800], Lantana lavandulacea Willd. [1800], Lippia asperifolia A. Rich. [1801], Zapania globiflora A. L. Juss. [1806], Zapania odorata Pers. [1806], Lippia geminata H.B.K. [1818], Lantana geminata (H.B.K.) Spreng. [1825], Lippia capensis (Thunb.) Spreng. [1825], and Lippia alba (Mill.) N. E. Br. [1925]. Many of these names, however, must go to the synonymy of L. alba if that taxon is kept distinct, as it is by me. Cufodontis (1962) follows Meeuse in uniting the African and American plants, and he follows Brenan (1954) in reducing L. whytei Moldenke to this aggregate superspecies, too. He notes "Mirabile dictu, cl. MEEUSE 1942 teste, haec species in Java ipsa nunquam visa est."

In a letter to me from Dr. Meeuse, dated September 28, 1953, he says: "I am inclined to believe that Pearson's L. rehmannii, L. wilmsii, L. bazeiana and L. pretoriensis can hardly be different from 'L. asperifolia' (=L. javanica)". In a letter dated December 9, 1953, he says "First of all, I noticed that you list L. javanica from Africa only and the related L. alba for America. When I examined the type of L. javanica many years ago, I was under the impression that L. alba and L. asperifolia were full synonyms, so that I hope that you studied the type of L. javanica at Geneva yourself and did not decide on my authority that the epithet javanica applies to African plants." A photograph of this type to which he refers here is cited below and indicates without any possibility of doubt that the plant is L. javanica, not L. alba.

Miss J. L. Warren, in a letter to me dated July 5, 1961, says "I am still not satisfied as to the characteristics which have been used to separate Lippia wilmsii Pearson from Lippia javanica (Burm. f.) Spreng."

Pearson (1901) also regarded the American and African plants as conspecific, giving as additional synonyms for the African element: Verbena globiflora L'Hér., Zapania odoratissima Scop., Z. lantanoides Lam., Z. odorata Pers., Z. globiflora Poir., and Lantana lavandulacea Willd., all of which belong in the synonymy of Lippia alba. Brenan (1954) is apparently not so sure that the Old and New World plants are conspecific. Under L. javanica he says "A common plant in many parts of east tropical Africa, ranging from Abyssinia south to Cape Province and west to Angola. ?Also in tropical America, India, and Australasia. I have followed A. D. J. Meeuse (Blumea 5: 68. 1942) in using the name Lippia javanica for a plant better known to students of the African

flora as Lippia asperifolia A. Rich. A complete synonymy will be found in the article cited, to which I have added Lippia whytei Moldenke, since this plant appears to me to be scarcely more than a narrow-leaved, subsessile-flowered form of L. javanica. At the same time, I should point out that the American and Indian specimens in the Kew herbarium, labeled L. javanica, L. alba, and L. geminata, differ from the African plant in having strictly geminate inflorescences, and larger pink or mauve corollas. It may be that the type-specimen of L. javanica agrees with the American rather than the African material, but until it has been examined, I am not prepared to make a change in the proposed nomenclature. Verbena globiflora L'Hérit. and Zappania odoratissima Scop. are, to judge from the figures given by these authors, conspecific with the African plant."

It should be mentioned here that some authors cite J. Burm. in Plum., Pl. Amer. 60, pl. 71, fig. 2 (1755) to the species here under discussion, but I feel that the "Lantana inermis foliis oppositis, ovatis" illustrated there is Lantana jamaicensis Britton and has nothing to do with N. L. Burman's Verbena javanica.

It should also be noted here that the Lippia asperifolia of Bentham and of Reichenbach, mentioned in the synonymy above, belong in the synonymy of Phyla scaberrima (A. L. Juss.) Moldenke; that of Hochstetter is Lippia baumii Gürke; and that of Poeppig, A. Richard, and Humboldt, Bonpland, & Kunth are L. alba (Mill.) N. E. Br.; the Verbena capitata of Blanco, of Blume, and of Forskål is Phyla nodiflora (L.) Greene; the Verbena odorata of L'Héritier and of Persoon is Lippia alba (Mill.) N. E. Br., while that of Meyen and of Meyer is Verbena laciniata (L.) Briq. The name, Lippia asperifolia argentiniensis Gill. & Schau., is a synonym of L. grisebachiana Moldenke, while Verbena capensis folio capillacea Ray and V. capensis f. capillaris Ray are Hebenstretia erinoides L. f. in the Selaginaceae.

Baker (1900) separates the tropical African species of Lippia known to him as follows:

1. Bractlets orbicular, obtuse.
  2. Peduncles very short.....L. oatesii.
  2a. Peduncles long.....L. radula.
1a. Bractlets acute, acuminate, or cuspidate, not orbicular.
  3. Bractlets cuspidate.
    4. Leaves small.
      5. Leaves orbicular or obovate.....L. somalensis.
      5a. Leaves oblong, rugose.....L. javanica.
    4a. Leaves larger, oblong or oblanceolate-oblong, scarcely rugose.....L. abyssinica.
  3a. Bractlets acute or acuminate.
    6. Bractlets acuminate.
      7. Leaves decussate-opposite.....L. ukambensis.

7a. Leaves ternate.....L. burtonii.
6a. Bractlets acute.....L. plicata.

Pearson (1901) differentiates the related South African species as follows:

1. Calyx distinctly 2-lobed.
2. Bractlets more than 4 mm. long and 3 mm. wide, surpassing the flowers.....L. scaberrima.
2a. Bractlets less than 4 mm. long and 3 mm. wide, not surpassing the flowers.....L. javanica.
1a. Calyx truncate, subtruncate, or obscurely lobed.
3. Leaf-blades serrate or crenate-serrate.
4. Bractlets more than 4 mm. long; calyx truncate or obscurely 4-toothed.....L. wilmsii.
4a. Bractlets less than 4 mm. long; calyx obscurely 2-lobed.....L. rehmanni.
3a. Leaf-blades crenate.....L. pretoriensis.

Although Pulle (1906) records a "L. asperifolia L. C. Rich.", from Surinam, he is actually referring to L. asperifolia A. Rich., a synonym of the American L. alba (Mill.) N. E. Br. Pearson (1905) states that his L. pedunculata differs from what we now know as L. javanica in having a 4-toothed calyx, larger bractlets and spikes, and less hairy, rougher, and larger leaves.

Schauer (1847) places our plant in his Subsection Axilliflorae of Section Zapania. It has been found by collectors in grassy places and grasslands, steppes and grass steppes, open woods, cultivated soil, low veld bush on riverbanks, coastal bush on white sand, and semi-closed bush country, on dry hillslopes and shaley ridges, sandy flats, granite kopjes, and quartzite in ravine bottoms, along fencerows, among rough grass, at the edge of thickets and bush, bordering grasslands, and growing in the open, at altitudes of sea-level to 2400 meters, flowering from October to August, fruiting from February to June and in August and October. Quarré refers to it as "very common in almost all kinds of soil" in the Congo; Van Nouhuys & Obermeyer call it "common" in the Transvaal; Hornby says that it is "occasional in Brachystegia-Isoberlinia woodland on light red soil" in Southern Rhodesia; while in Nyasaland it is said to be "occasional" by Wiehe and "frequent in Brachystegia woodland on mountain slopes" by Brass. Wild found it to be frequent in red soil areas; Swynnerton calls it a "common tall weed"; Eyles refers to it as a "roadside weed"; Mogg found it "abundant on valley sides"; Bogdan calls it "common in bush"; while Maas-Geesteranus reports it "scarce among tall grasses at edge of forest on grassy slope near stream with scattered shrubs" and "rather common in savanna woodland along edge of forest with scattered Acacia lahai and extensive clumps of dense brushwood."

The corollas are said to be "yellow" on Wild 1829; "cream" on Richards 7515 and Wild 2997; "whitish and violet" on Quarré 4061;

"greenish-white" on Faulkner 2762; "yellowish-white, yellow in throat" on Maas-Geesteramus 5210 & 6364; "limb white or purple, tube yellow" on Gillett 14504; and "white" on Codd 5014, Eyles 278, Faulkner 2314, Mogg 13135, Peter 42284 & 43581, Quarré 1094, Robyns 1548, Rodin 3871, Sidey 3261, Tyson 930, Wood 13019, and Wylie s.n. [Natal Herb. 22408]. Rodin describes the fruit as "purple" (!), while Schlieben says that the leaves "stink".

Vernacular names recorded for the species are "fever-tea", "Java vervain", "kirehera", "kjulu", "kundukunoka", "m'fungofana", "mosukutswani", "mumara", "mushani", "mu shani omkulu", "mu-tswane," "nzala", "umshani-umkulu", "umsuawana", "um-suswane", "umzinzinibe", "vumke", "zimbani", and "zumbani".

It is said that the pleasantly odorous crushed leaves are used by the natives in Nyasaland for sweeping. Swynnerton reports that brooms are made of this and are used by the natives to drive fleas from their huts, and that the leaves are also chewed as a remedy for colic in Southern Rhodesia. Estêves de Sousa states that in Mozambique the natives employ the leaves as a tea or syrup in the treatment of coughs and against intestinal parasites. Riley (1963) says that it is employed in the treatment of a certain type of insanity.

It is worth noting that Krauss (1845) lists his no. 247 as "n. sp." Codd refers to his no. 699 as a shade form growing in a kloof (a narrow usually wooded gorge). Van Dam s.n. [III.1920] approaches L. pedunculata H. H. W. Pearson in characters; Leendertz s.n. [29-2-1904] is labeled "intermediate toward L. rehmannii". Zeyher s.n. is too young and fragmentary for proper determination and therefore is placed here only tentatively. F. A. Rogers 357 is a mixture with L. scaberrima Sond., while his 6547 is a mixture with Lantana viburnoides (Forsk.) Vahl. Bojer s.n., collected on Pemba Island, bears a printed label inscribed "Madagascar".

Cockbill (1961) tells us that L. javanica is particularly susceptible to a mixture of 26 percent of equal parts of 2,4D and 2,4,5-T butyl esters in kerosene to give 3 & 6 percent concentration of acid equivalent to control brush in areas cleared of vegetation to restrict the spread of the tsetse-fly.

Material has been misidentified and distributed in herbaria under the names L. adoensis Hochst., L. africana Moldenke, L. burtonii J. G. Baker, L. caffra Sond., L. dulcis Trev., L. nodiflora Michx., L. oatesii Rolfe, Lantana lavandulacea Willd., L. salviaefolia Jacq., L. salvifolia Jacq., L. salviifolia Jacq., Verbena odorata L'Hér., Zapania odorata Pers., and Zappania globiflora Poir. Peter 42873 was distributed as "Lippia n. sp. aff. burtonii"

On the other hand, the Hinton 13149 distributed as this species is actually L. alba (Mill.) N. E. Br., Venturi 36 is L. asperrima Cham., Gossweiler 13439 is L. pearsoni Moldenke, Pedersen

1163 is L. recolletae Morong, and Quarré 87 is L. whytei Moldenke.

Schauer (1851) cites Bojer s.n. from Zanzibar, as well as Ecklon 10 & 11 and Drège s.n. from Cape of Good Hope. Baker & Stapf (1900) cite the following: ETHIOPIA: Roth 10 & 523. CONGO LEOPOLDVILLE: Descamps s.n. [Mtowa]. TANGANYIKA: Hoist 8893; Thomson s.n. [Lower Plateau, north of Lake Nyasa]; Volkens 218. ZANZIBAR: Bojer s.n.; Hildebrandt 995. KENYA: Scott-Elliot 6331; Thomson s.n. [Kapte Plateau]. ANGOLA: Welwitsch 5749 & 5750. SOUTHERN RHODESIA: Elliott s.n. [Matabeleland]; Oates s.n. [Matabeleland]. NYASALAND: Whyte s.n. [Mount Chiradzulu]. PORTUGUESE EAST AFRICA: Mozambique: Forbes s.n.; Kirk 71, s.n. [at the foot of Morambala Mountain], & s.n. [Shupanga]; Meller s.n. [Lower Valley of the River Shire].

Pearson (1901) cites the following: SOUTH AFRICA: Cape of Good Hope: Cooper 156; Hutton s.n. [Eastern frontier]; Mrs. Hutton s.n. [Keis Kamma]; Kuntze s.n. [Krantz Kloof]; MacOwan 503 & s.n. [in thickets near Grahamstown]; Tyson s.n. [MacOwan & Bolus 848]. Natal: Bowker 276; Cooper 1006; Gerrard 61 & 635; Gerrard & McKen 638; Grant s.n.; Krauss 247; Sanderson 97; Sutherland s.n. [coast land]; Wood 32. Transvaal: Wilms 1182. Province undetermined: Drège s.n. Chevalier (1913) cites his numbers 6556, 6619 bis, & 7014 from Ubangi-chari in the Central African Republic.

In all, 190 herbarium specimens and 7 mounted photographs, including type or phototype material of most of the names involved, have been examined by me.

Citations: ETHIOPIA: J. B. Gillett 14504 (B). CONGO LEOPOLDVILLE: De Giorgi s.n. [envir. Elisabethville, 1923] (Br); De Witte 469 (B); Herb. Ecole Salésiens S.706 (Br); Quarré 87 (Br, N), 1094 (Br), 4061 (Br), 4075 (Br), 4486 (Af); Ringoet 424 (Br); Robyns 1548 (Br, Br, Br); RRPP. Salésiens S.288, in part (Br). UGANDA: Mailland 1200 (K); Mearns 256 (N); G. H. S. Wood 433 (B). TANGANYIKA: Busse 2457 [A. Peter 51824] (Br), 3106 (Br), 3457 (B); Grote s.n. [A. Peter 51811/51823; 2.I.1913] (B, B); A. Horn s.n. [Mai 1912] (V—1034); Mrs. Hornby 40 (K); Mücke 175 (Af); A. Peter 1618 [O.I.39] (B), 1618a [O.I.39] (B), 2229 [O.I.56] (B, B), 2666 [O.I.63] (B), 2737 [O.I.65] (B), 42526 [V.288] (B), 42284 [V.283] (B), 42873 [V.299] (B), 43370 [V.306] (B), 43581 [V.315] (B, B), 44096 [V.324] (B), 46707 [V.283] (B), 51792 [O.IV.76.I] (B); Mrs. H. M. Richards 7515 (S); Schlieben 319 (B, S). PEMBA ISLAND: Bojer s.n. (P). ZANZIBAR: Collector undesignated 125 (T); H. G. Faulkner 2314 (S), 2762 (S); E. H. L. Krause 16813 (B); Paulay s.n. [Zanzibar, Aug. 1887] (V—10013, V—10014). KENYA: A. Bogdan B.29 (Ca—943462); Granvik 63 (S); Lindblom s.n. [Machakos] (S); Maas-Geesteranus 5210 (Ca—92330, S), 6364 (Ca—92526, S); E. Wall 9

(Go). NORTHERN RHODESIA: Gairdner 406 (K). SOUTHERN RHODESIA: C. E. F. Allen 497 (Rh); J. Borle s.n. [25.1.21] (K); Brain 5536 (Bm, N); N. C. Chase 208 (Rh--14735); Corby 667 [Govt. Herb. Salisbury 29517] (N); Dehn 53 (Rh--8787); F. Eyles 278 (Rh); Hack 45/50 (Rh--27191); Hislop 40 (K); J. C. F. Hopkins s.n. [Govt. Herb. S. Rhodesia 7969] (N); R. M. Hornby 3221 [Govt. Herb. Salisbury 32893] (Bm, N); R. W. Jack 97 (Rh--11954); A. Newton 62 (Rh--19517); Pierson s.n. [29.4.31] (Rh--4003); Swynnerton 475 (Rh); A. J. Teague 229 (K); Wild 1829 (Rh--16175), 2997 (Rh--25194). NYASALAND: Brass 16029 (N); Laurence 353 (K); Wiehe N.488 [Govt. Herb. Salisbury 28305] (N). PORTUGUESE EAST AFRICA: Mozambique: Estêves de Sousa 157 (Af); A. Peter 30519 [V.17] (B); F. R. R. Schlechter 12230 [Herb. Hort. Then. I.5161] (Br). Quelimane: H. Faulkner 42 (S). BECHUANALAND: F. A. Rogers 6547, in part (S). SOUTH AFRICA: Cape of Good Hope: Drège s.n. [zwischen Keiskamma und Buffelrivier] (S); Ecklon & Zeyher 10 & 11 (S, S); Gilfillan 29 [Galpin 6165] (Af, N--photo); Herb. Swartz s.n. (S, S); Krook s.n. [Penther 1792] (S); Kuntze s.n. [King Williams Town, 1/3/94] (N); Mogg 13135 (Ss); Pappe s.n. [Buffalo R.] (S); Sidey 638 (S); L. E. Taylor 1817 (Af); Tyson 980 (Af), s.n. [MacOwan & Bolus 848] (Vt); Wahlberg s.n. [Cap. B. Spei] (S); E. Wall 10, in part [2/10/38] (Ew), 10, in part [7/11/38] (Ew), 10, in part (Ew), s.n. [20/10/38] (Ew); Zeyher s.n. (S). Natal: Gueinzius 412 (S); Kuntze s.n. [Kranz Kloof, 12/3/94] (N); Mogg 1180 (Af), 4397 (W--1425525), 6002 (Af); Rudatis 618 (Af, S); Sanderson 97 (S); F. R. R. Schlechter 2873 (Br, S), 2875 (S); Sidey 3261 (S, W--2317835); J. M. Wood 13019 (Af, Vt), s.n. [10-3-1915] (Vi); Wylie s.n. [Natal Herb. 22408] (Gg--224156). Transvaal: J. P. H. Acock 11336 (Cb); Acocks 12410 (Af); W. G. Barnard 15 (Af); Barnard & Mogg 744 (Cb); Cholmondeley s.n. [Nov. 1933] (Cm); L. E. Codd 699 (Ss), 5014 (Ss), 6554 (Af), 7941 (Af); M. Collins 160 (Cb); D'Estourgies s.n. [1877] (Br, Br, Br, Br, Br, Br); Dyer 3960 (W--1940593); E. E. Galpin 14421 (Cb, N); Haptröm & Acock 1323 (S, S); Junod 4335 (Af); Leendertz s.n. [29-2-1904] (Z); Meeuse 9042 (Af); Mogg 16825 (Cb), s.n. [6.3.39] (N), s.n. (S); Obermeyer, Schweickerdt, & Verdoorn 7 (Cb), 129 (Cb); Pole-Evans 32 (S); Rodin 3871 (W--1991406); F. A. Rogers 357, in part (S); Schlieben 7011a (B, N, W--2272015); Schweickerdt 1222 (Af, S); C. A. Smith 359 (Af), 6153 (Af, Ss); Van Dam s.n. [III.1920] (Cb); Van den Schyff 3426 (Cb); Van Nouhuys & Obermeyer s.n. [Herb. Transvaal Mus. 27669] (N); Van Warenlo 68 [Herb. Transvaal Mus. 37961] (Af); E. Wall s.n. [2/10/38] (S), s.n. [5/10/38] (S), s.n. [17/10/38] (S); Wasserfall & Niekerk 15, in part (Af); Watt & Brandwijk 990 (Af). CULTIVATED: France: Herb. W.

H. Harvey s.n. [h. P., Aug. 1850] (Du--166582), s.n. [du jardin de Paris, Aug.] (Du--166477); Herb. Hort. Audibert s.n. (K); Herb. Jewett s.n. (Mi); Herb. Lugd.-Bat. 20935-242 (Le, N--photo, Z--photo), 908263-482 (Le); Herb. Martius s.n. [h. R. P.] (Br); Herb. Mus. Bot. Stockholm s.n. (S); Herb. Persoon s.n. (Le--908263-483, N). Java: Burman s.n. (Cb--type, N--photo of type); Collector undesignated s.n. [Klinhoff] (Cb, N--photo). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 34 (Br); Herb. Linnaeus G.35, S.10a (Ls, N--photo, Z--photo); Herb. Martius s.n. (Br); Louis 230 [N. Marico] (Af).

LIPPIA JUNELLIANA (Moldenke) Troncoso, Darwiniana 10: 75--78, fig. 3. 1952.

Synonymy: Lippia lantanifolia var. crenata Griseb., Abhand. Kais. Gesell. Wiss. Götting. 19: 243. 1874. Lippia crenata (Griseb.) Kuntze, Rev. Gen. Pl. 3 (2): 251. 1898 [not L. crenata Pearson, 1959, nor Sessé & Moc., 1894]. Lippia crenata Kuntze apud Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904. Lantana junelliana Moldenke, Phytologia 1: 279. 1938.

Bibliography: Griseb., Abhand. Kais. Gesell. Wiss. Götting. 19: 243. 1874; Griseb., Pl. Lorentz. 195. 1874; Kuntze, Rev. Gen. Pl. 3 (2): 251. 1898; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; A. W. Hill, Ind. Kew. Suppl. 7: 139, 1929; Seckt, Fl. Cordob. 417. 1929-1930; Seckt, Rev. Univ. Nac. Cordoba 17: 89. 1930; Moldenke, Phytologia 1: 279 (1938) and 1: 413. 1940; Moldenke, Lilloa 6: 321 (1941) and 8: 422. 1942; Moldenke, Alph. List Invalid Names 30 & 31. 1942; Moldenke, Alph. List Cit. 1: 96 (1946) and 2: 442. 1948; Moldenke, Lilloa 14: 35 & 36. 1948; Moldenke, Alph. List Cit. 4: 1190. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 104 & 188. 1949; Troncoso, Darwiniana 10: 75--78, fig. 3. 1952; G. Taylor, Ind. Kew. Suppl. 12: 82. 1959; Moldenke, Résumé 125, 311, 313, & 459. 1959; Moldenke, Résumé Suppl. 7: 6 & 8 (1963) and 8: 4. 1964; Moldenke, Phytologia 12: 56. 1965.

Illustrations: Troncoso, Darwiniana 10: 76, fig. 3. 1952.

Fragrantly aromatic much-branched shrub or subligneous subshrub, 0.8--2 m. tall; stems cylindric, with gray bark, straight or arcuate, rigid, subtetragonal, finely pubescent toward the apex, otherwise glabrous, with smooth reddish-brown bark; leaves decussate-opposite, petiolate; petioles 4--7 mm. long, pubescent; leaf-blades oval-lanceolate, 2--7 cm. long, 1--3 cm. wide, subacute or rounded at the apex, finely and regularly crenate along the margins except at the base, subcuneate at the base, penninerved, rugose and hirsute-pubescent above with short hairs that are callose-based along the edges and at the apex of the leaf, densely canescent beneath and glandular-punctate beneath the pubescence; venation impressed above, prominent beneath, conspicuously reticulate on both surfaces; inflorescence axillary, pedunculate; peduncles solitary, 1.5--5 cm. long; heads dense, the bractlets and flowers easily caducous; outer bractlets lanceolate, 6--7 mm.

long, 2--3 mm. wide, venose, pubescent, ciliate-margined; calyx tubular, 4--4.8 mm. long, 2-lipped, each lip 1--3-dentate with short teeth, easily separated into 2 halves, pubescent on the upper third with long dense matted hairs, with a lanate aspect on the lower 2/3, glandular-punctate beneath the pubescence; corolla hypocrateriform or tubular, violet or red-violet to lilac, rose-lilac, or rose, 2-lipped, the tube pubescent on the outside on the upper half, glabrous on the lower half, the limb with the upper lip short and 2-lobed, the lower lip much larger and 3-lobed; stamens and pistil typical of the genus; fruit dry, oval, 1.8--2 mm. long, 1--1.2 mm. wide, smooth, 2-celled, the cells 1-seeded, but usually 1 seed semi-atrophied, easily separated into 2 mericarps, each 1-celled, the young fruit with a thin layer of endosperm which disappears when the fruit is mature.

The type of this interesting species was collected by Günther Lorentz in woods and thickets near Ascochinga, Córdoba, Argentina, flowering in August. The original description reads "L. lantanifolia var. crenata Griseb. foliis crenatis (in α argute serrata sunt). Cordoba, in sylvis et fruticetis pr. Ascochinga."

The L. crenata of Pearson is a synonym of L. pretoriensis H. H. W. Pearson, while that of Sessé & Mocino is L. alba (Mill.) N. E. Br. Troncoso (1952) comments: "Moldenke.....pasó esta especie al género Lantana, bajo L. Junelliana. Su fruto, muy similar al de L. Grisebachiana y su cáliz característico de Lippia, hacen que los considere pertenecientes al misma género, hasta que un estudio monográfico permita delimitar con claridad estos géneros, Lantana y Lippia.....Muchos de los ejemplares fructíferos presentan el fruto parasitado por un insecto cuya larva desarrolla en el interior del ovario, presentándose la flor atrofida y retorcida da dentro del cáliz ligeramente hinchado."

The plant has been collected on hills near limestone quarries, hilltops, mountaintops, at the edges of woods, and in woods and thickets, at altitudes of 490 to 1200 meters, flowering and fruiting from November to May and in September. Digilio & Grassi 2033 is placed here tentatively. It may possibly represent a hybrid with L. turbinata Griseb.

The flowers of L. junelliana are described as "lilac" on Giardelli s.n. [12.XI.1935], Hunziker 8002, and Terribile 736, "rose-lilac" on Burkart 10408, "violet" on Venturi 815, "red-violet" on Osten 10614 & 13109, and "rose" on Cuezzo 919, and "limb rose-lilac" on Hunziker 6736, while Troncoso 302 is described as having "flowers lilac at edge, yellowish-white in center".

Material of this species has been misidentified and distributed in herbaria under the names Lippia lantanifolia Griseb. and Lantana sellowiana Link & Otto.

In all, 54 herbarium specimens and 3 mounted photographs have been examined by me.

Citations: ARGENTINA: Buenos Aires: Née 6 (Q). Córdoba: H. H.

Bartlett 20072 (Ca--772481, Mi, W--1904838); Bruch 8233 (N), s.n. [Unquillo, III.1926] (S); Burkart 10408 (N), 20386 (Ca--86379); Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 11667] (N), s.n. [Herb. Mus. Argent. Cienc. Nat. 11668] (N), s.n. [Herb. Mus. Argent. Cienc. Nat. 31199] (N); Cuezzo 751 (N), 919 (N, S); M. Escalente 16 (W--1987973); Giardelli 118 (W--2056260), 157 (W--2056261), s.n. [Ascochinga, 12.XI.1935] (N); G. Hieronymus 840 [Macbride photos 17500] (Kr--photo, N--photo, W--photo), s.n. [Sierra Chica, 14.1.1876] (Br, N), s.n. [San Vicente, XII.1876] (W--281550), s.n. [Córdoba, X.1929] (Br); A. T. Hunziker 6736 (N, N), 8002 (N), s.n. [6-IX-1946] (Vi); Kuntze s.n. [Dique bei Córdoba, XII.91] (N, N); T. Meyer 13304 (N); Nicora 876 (W--2056265); O'Donell & Rodriguez 484 (Ut--115402b); Osten 10614 (Ug), 13109 (Ug); Rodrigo 2313 (N); Ruíz Leal 12508 (Z); Scolnik 46 (N); Sparre 1404, in part (S); Terribile 718 (N), 736 (N, Vi); Troncoso 302 (Ca--1003489, N, W--1858384); Wall & Sparre s.n. [La Falda, 15/12/46] (Ew, Ew). La Rioja: Castellanos s.n. [Sierra Brava, Feb. 17, 1940; Herb. Mus. Argent. Cienc. Nat. 33896] (N). Salta: R. Aguilar 233 (Ca--1165488); Schreiter 6698 [Herb. Inst. Miguel Lillo 32706] (N). San Luis: Digilio & Grassi 2033 (N); Varela 642 (Ca); D. Wright s.n. [Los Molles, 1928] (Bm). Santiago del Estero: Pierotti s.n. [9/IV/1944] (W--1934012). Tucumán: Venturi 815 (W--1591231). Province undetermined: Née 128 (Q).

LIPPIA KITUIENSIS Vatke, Linnaea 43: 528 [as "L.? kituiensis"]. 1882.

Synonymy: Lippia kituensis Vatke apud K. Schum. in Just, Bot. Jahresber. 28 (1): 496, in syn. sphalm. 1902.

Bibliography: Vatke, Linnaea 43: 528. 1882; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Gürke in Engl., Pfl. Ost-Afr. C: 338. 1895; K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 50 & 95 (1942) and [ed. 2], 118 & 190. 1949; Moldenke, Phytologia 3: 456 & 457. 1951; Moldenke, Résumé 142, 146, & 461. 1959.

Branches firm, strict, angulate, hispid-scaberulous; leaves decussate-opposite, petiolate; petioles to 1 cm. long; leaf-blades ovate- or oblong-lanceolate, to 5 cm. long and 2 cm. wide ["in folio unico non plane conservato ad 4 cm. lato"], obtuse at the apex, crenate along the margins, attenuate at the base, rugulose and scaberulous above or finally glabrate, hispid throughout beneath, densely so along the venation; inflorescence axillary, binary; peduncles to 2.5 cm. long; heads subglobose, bracteolate; bractlets spiral, oblong-linear, numerous, imbricate, forming an involucre which subequals the corolla-tubes; corolla white, about 5 mm. long and 4 mm. wide, the tube hispid, inflated above; fruit unknown.

The type of this poorly known species was collected by Johann Maria Hildebrandt (no. 2738) at Kitúi, in Ukamba, Kenya, in May,

1877. The plant has been collected in anthesis only in May. Schumann (1902) places the species in the synonymy of Lantana rugosa Thunb.

In all, 7 herbarium specimens and 1 mounted photograph of the type collection have been examined by me.

Citations: CONGO LEOPOLDVILLE: Quarré 2906 (Br, Br, Br, Br, Br, Br, N). KENYA: Hildebrandt 2738 (N--photo of isotype).

LIPPIA LACUNOSA Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 590. 1847.

Synonymy: Lippia cordata Turcz., Bull. Soc. Nat. Mosc. 36 (2): 205. 1863. Lippia lacunosa Mart. ex Moldenke, Prelim. Alph. List Invalid Names 56, in syn. 1940.

Bibliography: Schau. in A. DC., Prodr. 11: 590. 1847; Turcz., Bull. Soc. Nat. Mosc. 36 (2): 205. 1863; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 100. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Moldenke, Prelim. Alph. List Invalid Names 56. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Invalid Names 30, 31, 223, & 238. 1942; Moldenke, Phytologia 2: 385. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 689, 705, & 824. 1949; Moldenke, Résumé 93, 311, 313, & 461. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 6: 6. 1963; Moldenke, Phytologia 12: 24. 1965.

Branched shrub, to 1.5 m. tall; stems corymbose-fasciculate above; branches and branchlets fastigiate, scabrous, the upper ones floriferous; leaves decussate-opposite, ternate, or approximate, subsessile, spreading, equaling or longer than the internodes, the blades rigid, ovate, 2.5--3 cm. long, 1.8--2.4 cm. wide, decreasing in size upwards, rather acute or obtuse at the apex, crenate along the margins, cordate at the base, shiny and very scabrous above, canescent, reticulate-venose, and scrobiculate beneath, the tomentum very sparse, the floral leaves very small; inflorescence axillary, solitary, racemose-congested at the apex of the branchlets; peduncles short; heads subspicate, many-flowered; bractlets subherbaceous, ovate, about 4 mm. long, short-acuminate at the apex, conspicuously 5-veined, subhirtellous-pubescent, loosely imbricate, half as long as the corolla-tube; calyx short, narrow, bifid, sericeous-villous, the lobes acute at the apex, 2-toothed; corolla lilac, hypocrateriform, hirtellous on the outside, the tube about 6 mm. long, transversely elliptic-truncate below, broadly unguiculate, the throat yellow.

This species is based on Pohl 131, from Ponte Sieto, Minas Gerais, Brazil, and apparently unnumbered collections of Lund, Martius, Riedel, and Sellow, all from "In campis deserti prov. Minarum Brasiliae", deposited in the herbaria at Berlin (now destroyed), Vienna, Leningrad, Munich, and Geneva (DeCandolle herbarium). The Pohl collection was photographed by Macbride in the herbarium of the Botanisches Museum at Berlin as his type photograph number 17521, but is now destroyed. The type of L. cordata

was collected by George Gardner (no. 4330) in Goías, Brazil. Schauer (1847) places the species in his Section Zapania, Subsection Corymbosae. He says (1851) "Proxima L. rotundifoliae a qua differt foliorum et bractearum figura atque magnitudina."

Lippia lacunosa has been collected in the grassy edges of woods, flowering in April and May. J. E. Pohl 186 is not typical in regard to its inflorescence, which is like that of L. rotundifolia Cham., to which the species is certainly closely related. Material has been misidentified and distributed in herbaria as L. rotundifolia Cham.

In all, 16 herbarium specimens and 5 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: BRAZIL: Brasilia: Heringer 8195 (N); Murça Pires, Silva, & Souza 9409 (Z). Goías: G. Gardner 4330 (M, N); Glaziou 21896 (Br, S), 21897 (Br, N, S, W--1112530); Sena 2 [Herb. Inst. O. Cruz 219] (W--2342980). Matto Grosso: Malme 3385 (S), s.n. [Santa Anna da Chapada, May 27, 1903] (S). Minas Gerais: J. E. Pohl 131 [Macbride photos 17521] (It--photo of cotype, Kr--photo of cotype, N--photo of cotype, N--photo of cotype, W--photo of cotype), 186 (Br), 2959 (N). State undetermined: G. Gardner 5116 (W--702439).

LIPPIA LANATA Walp., Repert. Bot. Syst. 4: 43. 1845.

Bibliography: Walp., Repert. Bot. Syst. 4: 43. 1845; Schau. in A. DC., Prodr. 11: 593. 1847; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 95 (1942) and [ed. 2], 31 & 190. 1949; Moldenke, Résumé 37 & 461. 1959.

Subacaulescent perennial herb, cespitose, many-headed, from a woody rhizome, very densely white-lanate throughout, with the habit of a Plantago; internodes very short, 2.5--4 cm. long; leaves rosulate, opposite, rather thick, 2.5--4 cm. long, 1--1.2 cm. wide, cuneate, obtuse and obsoletely 3-dentate at the apex, attenuate at the base; inflorescence axillary, equaling the leaves, 1-headed; peduncles solitary, filiform, tetragonal, hardly longer than the leaves, white-lanate; heads subpyramidal-globose, 6--8 mm. long; bractlets obcordate, very densely lanate, the lower ones forming an involucre longer than the flowers, the upper ones shorter, all subacuminate at the apex; corolla flesh-color, hypocrateriform-tubular, shorter than the lower bractlets, glabrous, the throat villosulous, the limb 4-fid, one lobe larger and subemarginate at the apex; fruit drupaceous, obcordate-globose, subcompressed, girded by the membranous villosulous mature calyx, dark, lanuginous, apiculate with the base of the persistent style, 2-celled, the cells 1-seeded.

All that Walpers says about this species besides the above description is "Crescit in summis Andibus Mexicanis. (v.s.sp.)" It seems most unlikely that the plant is a Lippia or even verbenace-

ous. It is known to me only from the original description.

LIPPIA LANTANIFOLIA F. Muell., Fragm. 6: 151. 1868 [not L. lantanifolia Griseb., 1874].

Bibliography: F. Muell., Fragm. 6: 151. 1868; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Phytologia 1: 279. 1938; Moldenke, Lilloa 5: 422. 1940; Moldenke, Phytologia 1: 504. 1941; Moldenke, Lilloa 10: 342 & 343. 1944; Moldenke, Castanea 13: 120. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 153 & 190. 1949; Moldenke, Résumé 209 & 461. 1959.

An erect shrub, a few feet tall, odorous; branches hirtous-pubescent and rough; leaves conspicuously petiolate; leaf-blades ovate or cordate-orbicular, 2--3.2 cm. long, obtuse at the apex, crenate-serrulate along the margins, rugose, paler green beneath; inflorescence axillary; peduncles single or sometimes binary, shorter than the leaves, 0.8—2.5 cm. long; heads ovate, densely imbricate; bractlets deltoid or orbicular-rhombic, herbaceous, acute or acuminate at the apex, the lower ones about 3 mm. long; calyx membranous, scarcely 2 mm. long, wingless, appressed-pubescent; corolla rather large, rose, the tube almost 4 mm. long, the upper lip almost semi-orbicular, entire, the lower lip with the central lobes half as long as the reniform-orbicular middle lobe; stamens included; filaments very short; anthers 4, cordate-globose; style very short; fruit globose, 2 mm. long, somewhat compressed, dry, surrounded by the mature calyx, easily separating into 2 mericarps; pericarp crustaceous.

The type of this species was collected by Anthelme Thozet and O'Shanesy in the vicinity of Rockhampton, Queensland, Australia. Mueller (1868) says of it: "A Lippia asperifolia jam differt forma foliorum, corollae tubo longiore, limbo ampliore, a L. dulci bracteolis, corollis fructibusque bis terve majoribus, fructu haud ovato."

This species is known to me only from the literature. The L. lantanifolia of Grisebach is L. grisebachiana Moldenke, and L. lantanifolia var. crenata Griseb. is L. junelliana (Moldenke) Troncoso.

LIPPIA LASIOCALYCINA Cham., Linnaea 7: 231--232. 1832.

Synonymy: Lantana melissifolia Clausen ex Moldenke, Alph. List Invalid Names Suppl. 1: 12, in syn. 1947.

Bibliography: Cham., Linnaea 7: 231—232. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 599. 1843; Walp., Repert. Bot. Syst. 4: 52. 1845; Schau. in A. DC., Prodr. 11: 591. 1847; Schau. in Mart., Fl. Bras. 9: 247 & 307, pl. 39 left. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1162. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 497. 1904; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Stapf, Ind. Lond. 4: 125. 1930; Moldenke, Lilloa 5: 424. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 40, 41, & 95. 1942; Moldenke, Alph. List Cit. 1: 12, 121, 164, 230, 264, & 289. 1946; Moldenke, Alph.

List Invalid Names Suppl. 1: 12. 1947; Moldenke, Lilloa 14: 43. 1948; Moldenke, Alph. List Cit. 2: 362, 364--366, 370, 534, & 553 (1948), 3: 670, 675, 676, 689, 846, 870, & 923 (1949), and 4: 1203, 1204, & 1296. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 97, 99, & 190. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 348. 1951; Moldenke, Résumé 93, 114, 116, 306, & 461. 1959; Moldenke, Résumé Suppl. 3: 13. 1962; Moldenke, Biol. Abstr. 45: 5019. 1964; Moldenke, Phytologia 12: 24 & 174. 1965.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 39 left. 1851.

Shrub, to 1.1 m. tall; branches strict, gray, angular, shiny; branchlets sulcate, rather scabridous-hirtellous, leafy above, with a few alternate leaves below, or leafless; buds mixed, naked, yellowish-lanuginous; leaves annual, deciduous, ternate or alternate, very short-petiolate; leaf-blades firm, ovate-elliptic, about 5 cm. long when mature and 1.4 cm. wide at the middle, acuminate at the apex, coarsely acute-serrate to the middle along the margins, impressed-penninerved above, shiny and very rough above, pale and pulverulent-glandulose beneath, scabrid on the venation; inflorescence verticillate-congested, contiguous above, showy, rarely borne with the mature leaves at the apex of this year's branchlets; racemes pedunculate, many-flowered, often solitary and axillary at the base of the new branchlets, at first rather compact with erect bractlets, later very loose and with elongate rachis and spreading or reflexed bractlets; peduncles pilose-scabrous; rachis pilose-scabrous; calyx very short-pedicellate, short, rather ampliate, bifid, the lobes 2-toothed, later 2-parted, very hirsute with wide-spreading straight distinct hairs; bractlets alternate, membranous, subequaling the corolla-tube; corolla hypocrateriform, red or rose to rose-lilac, thin-textured, pellucid, very sparsely pilose on the outside, glabrous inside, the tube about 8 mm. long, yellow inside, cream-colored outside, slightly incurved, somewhat ampliate above, not ventricose, the throat yellow, the limb about 6 mm. wide, venose, the outer part of the top purple, white near the throat, the upper and lateral lobes subequal, rounded at the apex, the lower lobe somewhat larger, truncate at the apex; fruiting-calyx closely appressed to the fruit; fruit typical of the genus, covered by the adhering calyx, oblong, truncate at the base, separating into 2 parts, but one seed tabescent; cotyledons fleshy; rostellum inferior, very small.

The type of this species was collected by Friedrich Sellow at São Antonio de Monte, Minas Gerais, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17522, but is now destroyed. The type of Lantana melissifolia was collected by Peter Clausen (no. 619), also in Minas Gerais, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm.

Schauer (1847) places L. lasiocalycina in his Section Zapania, Subsection Corymbosae. He says (1851): "Frutex inter congeneres foliis annuis, florescentia et frondescentia plerumque coaetanes,

inflorescentiae indole et ubertate maxime insignis". It has been collected on campos, flowering in April, July, and September to November, fruiting in October. The Eitens comment that it grows "in cerrado with scattered burned living trees to 10 m. tall, spaced 6--30 m. apart; ground cover mostly bunch grass". A wood sample of their no. 2230 is preserved in the United States National Museum in Washington. W. Hoehne 2717 represents a form with the stiff leaves present during anthesis and should be compared with L. phryxocalyx Briq. The F. C. Hoehne Com. Rondon 2839, distributed as L. lasiocalycina, is actually L. phryxocalyx.

Schauer (1851) cites the following specimens from Minas Gerais: Sellow s.n. [ad S. Antonio de Monte], Lund s.n. [in arenosis prope Aracoara, Majo], and Pohl s.n. [juxta flivium S. Francisci]; from Goías: G. Gardner 3405; and from Bolivia: Alcides d'Orbigny s.n. [prov. Chiquitos].

In all, 39 herbarium specimens and 5 mounted photographs, including type or phototype material of both names involved, have been examined by me.

Citations: BRAZIL: Bahia: A. Lutz 316, in part (Lz). Goías: G. Gardner 3405 (Br). Matto Grosso: Archer & Gehrt 69 (N, Sp--36446, W--1740782); F. C. Hoehne Com. Rondon 4049 (N); S. Moore 300 (C). Minas Gerais: P. Clausen 619 (N, N, S), s.n. [Aug.--April 1840] (Br); Glaziou 21915 (Br); N. Lund s.n. (Cp); Macedo 567 (N, S), 2034 (N, S, W--2196778); Regnell III.945 [5/10/1848] (N, S), III.945 [20/10/1848] (W--274926), III.945 [29/10/1848] (W--1322931); Sellow s.n. [S. Antonio de Monte; Macbride photos 17522] (It--photo of type, Kr--photo of type, N--photo of type, N--photo of type, W--photo of type). Paraná: Hatschbach 6378 (Z). São Paulo: Eiten & Eiten 2230 (W--2369842); G. Gehrt s.n. [Miguel Calmon, Sept. 22, 1919] (Sp--3622); W. Hoehne 2717 (Wh); Löfgren s.n. [Herb. Com. Geogr. & Geol. 911] (Sp--15654), s.n. [Herb. Com. Geogr. & Geol. 1414] (Sp--15648); N. Lund 2279 (Br); Pickel 3501 (Mm, Sf); Regnell III.945 [July 1848] (S), III.945a (S); J. E. Rombouts s.n. [Cosmorama, Sept. 25, 1938; Herb. Inst. Agron. S. Paulo 2706] (Sp, Sp--41091). BOLIVIA: Santa Cruz: D'Orbigny 971 (Br, Cb). PARAGUAY: Hassler 10630 (Cb, Cb).

LIPPIA LASIOCALYCINA var. SAINTHILAIREI Moldenke, Phytologia 9: 350. 1963.

Bibliography: Moldenke, Phytologia 9: 350. 1963; Moldenke, Résumé Suppl. 8: 2. 1964: Hocking, Excerpt. Bot. A.7: 455. 1964; Moldenke, Biol. Abstr. 45: 5019. 1964.

This variety differs from the typical form of the species in having its bractlets broadly ovate and merely acute or subacute at the apex.

The type of the variety was collected by August François Cesar Prouvençal de Saint-Hilaire -- in whose honor it is named -- at Olho d'Agua, Minas Gerais, Brazil, between 1816 and 1824.

# ADDITIONS TO THE LAURACEAE OF GUATEMALA

Cyrus Longworth Lundell

LICARIA ALATA Miranda, Ceiba 4: 128. fig. 1954.

GUATEMALA: Dept. Peten, Lacandon, in high forest on El Caribal trail, about 3 km. sw., Feb. 16, 1962, Elias Contreras 3410 (LL), tree, 60 ft. high, 12 in. diam., fruit green, "laurel."

Described from Chiapas, the tree is new to the Guatemalan flora.

LICARIA GUATEMALENSIS Lundell, sp. nov. — Arbor parva, ramulis gracilibus, glabris; folia petiolis 5–8 mm. longis stipitata; lamina elliptica, oblongo-elliptica vel lanceolata, 10–25 cm. longa, 3–8 cm. lata, basi acuta, apice acuminata vel caudato-acuminata, glabra, chartacea, subtus reticulata; paniculae axillares, pauciflorae, 1–3 cm. longae, subsericeo-tomentellae, pedunculis gracilibus, usque ad 2 cm. longis; pedicelli 2–6 mm. longi; flores glabri subglobosi, 2.5–3 mm. longi, 2.5–3 mm. diametro, lobis carnosis, late ovatis, ca. 2 mm. latis; stamina inclusa, connata; ovarium glabrum.

GUATEMALA: Dept. Alta Verapaz, Sebol, about 800 m. west of the village, in high forest bordering arroyo, April 15, 1964, Elias Contreras 4322 (LL, type), tree, 5 in. diam., 35 ft. high, flowers reddish, "laurel."

The 8 to 10 primary veins of the leaf anastomose on the lower surface to form a conspicuous marginal vein 7 to 10 mm. from the edge. The secondary veins are less conspicuously reticulate. The short panicles are borne on sharply reduced axillary branches giving them the appearance of being fasciculate. In this characteristic and flower size the species resembles L. Peckii (Johnston) Kosterm.

LICARIA TRIANDRA (Sw.) Kosterm., Meded. Bot. Mus. Utrecht 42: 588. 1937 (Rec. Trav. Bot. Neerl. 34: 588. 1937).

GUATEMALA: Dept. Peten, Laguna Petexbatun, in high forest on the peninsula, April 2, 1964, C. L. Lundell 18178 (LL), tree, 35 ft. high, "laurel."

Kostermans identified L. triandra with L. coriacea (Lundell) Kosterm. (l.c., p. 604), but the two appear to differ in characteristics of the cupule. In Lundell 18178 the leaves are oblanceolate or narrowly elliptic, usually cuneate at base and often caudate-acuminate. Although only fruiting material is available, the collection is referred to this species.

NECTANDRA PETENENSIS Lundell, sp. nov. — Arbor parva, usque ad 6 m. alta, ramulis crassis, angulatis, minute adpresse tomentellis, cinereis; folia petiolis 1–1.5 cm. longis stipitata; lamina novella utrinque albido-cinerea, lanceolata vel elliptico-lanceolata, 15–30 cm. longa, 4.5–12 cm. lata, apice obtuse acuminata, basi acutiuscula, recurvata, subcoriacea, utrinque novella minute subsericea, axillas subtus barbata, penninervia, nervis 7–11-paribus; inflorescentia axillaris, multiflora, corymboso-paniculata, minute adpresse canescenti-tomentella, foliis multo brevior, pedicellis 5–8 mm. longis; flores hermaphroditi, albi, minute subsericeo-tomentelli, diam. 12–14 mm.; perianthii tubus brevissimus; limbi segmenta obovato-elliptica vel late ovata, intus papilloso-tomentella; antherae subsessiles, serierum exteriorum late obtusae, basi brevissime, seriei III. longius attenuatae, apice subtruncatae, glandulis sessilibus; staminodia parva; ovarium glabrum.

GUATEMALA: Dept. Peten, Rio Salinas, above mouth of Rio Pasion, on riverbank, Feb. 8, 1964, C. L. Lundell 17791 (LL, type), tree, 4 in. diam., 20 ft. high, flowers snow-white, "laurel."

The affinity of the species is to N. globosa (Aubl.) Mez as interpreted by Mez in his monograph. The cinereous young growth and the large snow-white flowers well-mark the species.

OCOTEA TRUNCATA Lundell, sp. nov. — Arbor parva, 5 m. alta, ramulis apice sericeis, gracilibus; folia petiolis 4–7 mm. longis stipitata; lamina oblanceolata, oblongo-oblanceolata vel anguste elliptica, 4.5–8.5 cm. longa, 2–3.3 cm. lata, apice subabrupte caudato-acuminata, basi cuneata, chartacea, subtus novella parce sericea, obscure reticulata, in costarum axillis pilosa, penninervia, nervis 5- vel 6-paribus; inflorescentia anguste paniculata, perpauci-flora, novella parce sericea, foliis brevior; flores glabri; perianthii tubus conspicuus; limbi segmenta ovata, ca. 1.4 mm. longa; stamina 1–1.3 mm. longa; antherae ovato-rectangulares ca. 0.75 mm. longae, apice subtruncatae; ovarium glabrum, apice truncatum.

GUATEMALA: Dept. Alta Verapaz, Chapultepec Farm, 62 km. from Coban, in low forest on top of hill, May 20, 1964, Elias Contreras 4731 (LL, type), small tree, 2 in. diam., 15 ft. high, "laurel."

The truncate ovary is distinctive. Past the flowering stage, the perianth and stamens are described from dried out flower parts persistent on the cupule. No staminodia were observed. The costa of the leaf is puberulent above, otherwise the upper surface is glabrous, drying blackish. The paler lower surface is glabrous at maturity except in the axils and along the midvein.

The relationship appears to be with O. effusa (Meissn.) Hemsl.

OCOTEA VENOSA Lundell, sp. nov. — Arbor ad 16 m. alta, ramulis crassis, angulatis, glabris; folia petiolis usque ad 2.2 cm. longis stipitata, glabra; lamina elliptica vel obovato-elliptica, 17–27 cm. longa, 8–15 cm. lata, apice subabrupte et obtuse acuminata, basi rotundata vel acutiuscula, omnino glabra, chartacea, nigra, utrinque prominenti-reticulata, penninervia, nervis 5–7-paribus subtus conspicue elevatis; inflorescentia axillaris, laxe paniculata, ad 25 cm. longa, nigra, glabra, pauciflora, subcymosa, pedunculo ad 12 cm. longo; flores glabri, pedicellis 3–7 mm. longis, gracilibus; perianthii tubus conspicuus; limbi segmenta ovato-elliptica, ca. 2 mm.; stamina ca. 1.5 mm. longa; antherae subovatae, ca. 0.75 mm. longae; filamenta ca. 0.5 mm. longa; staminodia stipitiformia, ca. 1 mm. longa; ovarium glabrum.

GUATEMALA: Dept. Alta Verapaz, Semococh, 16 km. from Sebol on Coban Road, in high forest on top of hill, May 14, 1964, Elias Contreras 4678 (LL, type), tree, 30 in. diam., 50 ft. high.

Related to O. Standleyi Allen, it differs at once in its thin leaves with 5 to 7 pairs of primary veins. Also, O. venosa is entirely glabrous, and all parts dry black. The leaf venation is conspicuous on both surfaces. Only remnants of the floral parts are present, and from these the stamen measurements were taken. The inner series has a pair of globose glands at base.

PERSEA FLAVIFOLIA Lundell, Contr. Univ. Mich. Herb. 6: 17. 1941.

GUATEMALA: Dept. Peten, Remate, on Tikal Road, about 8 km. ne. of the village, in high forest, April 27, 1960, Elias Contreras 903 (LL), tree, 20 in. diam., 90 ft. high, flowers yellow.

Described from Chiapas, this is the first record for the species in Guatemala. The Peten tree, collected in the lowlands, is less sericeous than the specimens from the mountains of Mexico, and the open panicles have long slender peduncles.

PHOEBE TRINERVIS Lundell, sp. nov. — Arbor parva, ramulis novellis apice minute albido-subsericeo-pubescentibus; folia petiolis 6–10 mm. longis stipitata; lamina lanceolata vel oblongo-lanceolata, 5–8.5 cm. longa, 1.5–3.3 cm. lata, apice longe acuminata, basi acuta, raro rotundata, triplinervia, subtus novella minute areolata, coriacea, adulta praeter costarum axillas subtus barbellatas utrinque subglabra; infructescentia anguste paniculata, glabra, foliis brevior; fructus immaturus ellipsoideus, ca. 1 cm. longus; cupula rubra, 4.5 mm. diam., integra; pedicelli fructiferi usque ad 5 mm. longi.

GUATEMALA: Dept. Peten, Tikal National Park, on Remate Road, in zapotal, Jan. 29, 1964, C. L. Lundell 17591 (LL, type), tree, 5 in. diam., 30 ft. high, cupules and pedicels bright red.

Apparently akin to P. salicifolia Nees, P. trinervis is known only from fruiting material. It has distinctive white sericeous buds and branchlets with sparse fine subappressed white subsericeous indument. The leaves, barbellate in the leaf axils beneath, are subappressed pubescent at first along the costa and primary veins on both surfaces. The perianth lobes do not persist at the apex of cupule, as in P. salicifolia.

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## BOOK REVIEW

Alma L. Moldenke

"The Natural Geography of Plants", by Henry A. Gleason and Arthur Cronquist, viii + 420 pp., illustr. Columbia University Press, New York City, New York. 1964. $10.00

In this very interesting, easy reading and instructive book the "what", "where", "when", "how" and "why" (when known) of what makes up the "plantscapes" and the more naked landscapes of our world, and especially the North American continent north of Mexico, are very effectively treated. And many of the "whys" when not known are still asked in thought provoking manner.

In reference to distribution and range, emphasis is placed on the facts that plants determine the animals, that the total volume of vegetable matter is greater than that of animal sources, and that plants do not exert any territoriality as some animals do. But I wonder about certain plants whose sphere of growing influence, without perception of course, chases away certain other plants and/or animals.

Much of the basic information on plant migration may be condensed into the following quotes: "First, that all plants can and do migrate, although with various speeds and to various distances. Second, that all parts of the world are regularly planted, often unsuccessfully, with great numbers of seeds. Third, that the effect of short migrations depends on the time during which they are continued. Fourth, that the chance of a lucky accidental migration increases in proportion to the time available. And lastly, that we must never forget the importance of time in phytogeography." "The potential migration of most plants

is at least as rapid as the change of environment which enables them to grow in a new location." "Each kind of plant, we have found, has a geographic range which can be discovered by travel and search, a range which may be restricted or extensive. Always it shows discontinuous distribution. Within its range it is limited to certain habitats only, in which the environment suits it, and is absent from other habitats." "So rugged is competition that the plant can, on the average, produce only one descendant which will live to full maturity." Excellent, clearcut summations like these appear throughout the book.

In discussing the correlation of climate to vegetation, almost all factors were carefully considered, but no mention is made of the salt spray effect on plants along our long coast lines.

More than half of the book is devoted to careful descriptions of these ten floristic groups and their provinces in continental United States:

ARCTIC or TUNDRA PROVINCE in Alaska and above timberline on our New England and western mountains with the shortest growing season, permafrost, no trees, but with reindeermoss, peatmoss, cottongrass, moss campion, mountain heath, and cassiope;

NORTHERN CONIFER PROVINCE, a 500 mile boreal band with many lakes and bogs (muskegs) which support tamarack, balsam fir and black spruce along with some broad-leaved paper birch, quaking aspen and balsam poplar with little showy undergrowth;

EASTERN DECIDUOUS FOREST PROVINCE, once covering much more of our country, from Maine and Minnesota to the northerly limits of our southern states with sugar maple, beech, basswood, various oaks and hickories towering over many showy herbs and shrubs;

COASTAL PLAIN PROVINCE along the Atlantic and Gulf coasts and even up the Mississippi River some distance and west to the fall line with bald cypress, live oak, and longleaf, pitch, slash, and loblolly pines growing in somewhat sterile sandy soil along with prickly catbriers and many other herbs;

WEST INDIAN PROVINCE from southern Florida southward with its tropical flora of mangroves (*) on tidal flats, sawgrass freshwater marshes in the Everglades, and palm, mastic and gumbolimbo trees bedecked with their bromeliad and orchid epiphytes on raised hammocks;

GRASSLAND PROVINCE of the tall dry grass prairies from the western edge of Illinois and Iowa through the short drier grass

plains east of the Rockies and Texas with bluestem, buffalo, grama and Indian grasses, several composites and legumes;

CORDILLERAN FOREST PROVINCE, a relatively dry area in the mountains of our western states with Douglas fir, ponderosa and lodgepole pines, western red cedar, western hemlock, some broad-leaved maples, birches and oaks;

GREAT BASIN PROVINCE in western Utah, Nevada and adjacent areas, a cold desert with no drainage into the sea but rather into the Great Salt Lake for the most part with the abundant and conspicuous sagebrush, greasewood, bunchgrass, shadscale and piñon pine growing wherever the soil is not too alkaline;

CALIFORNIAN or CHAPARRAL PROVINCE from southwest Oregon through part of Baja California with a Mediterranean type climate supporting mostly manzanita, madrone, digger pine and California live oaks;

SONORAN PROVINCE of hot deserts and valleys in southern California, Texas and parts of Arizona and New Mexico with the most common creosote bush, bur sage, giant cactus, giant Joshua-tree, mesquite, palo verde, ocotillo and others all variously adapted to the water shortage by being ephemerals, succulents or drought-endurers in this quite bare ground.

What wonderfully clearcut photographs have been profusely set throughout the text! How sensible to choose these already available illustrations from sources like the United States Forest Service, the National Audubon Society and the New York Botanical Garden! I wish that the scientific names were given on all the illustrations. They do appear, however, in the text and in the index.

This book will certainly provide enjoyable reading for the professional and amateur botanists and for souls inclined toward general natural history. It will also be a valuable addition to the reading lists in college biology, botany and ecology courses.

(*) The correct name for "Avicennia nitida" is now A. germinans.

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# HERBARIUM NOTES, II

Lyman B. Smith

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## GRAMINEAE

DISSANTHELIUM MACUSANIENSE (Krause) R. C. Foster & L. B. Smith, comb. nov.

Graminastrum macusaniense Krause, Beih. Bot. Centralbl. 32:348. 1914. Valid publication by "descriptio generico-specifico" according to International Code of Botanical Nomenclature, article 42. 1961.

Dissanthelium minimum Pilger, Bot. Jahrb. 56, Beibl. 123:28. 1920; Swallen & Tovar, Phytologia 11:365. 1965.

DISSANTHELIUM MATHEWSII (Ball) R. C. Foster & L. B. Smith, comb. nov.

Deschampsia mathewsii Ball, Journ. Linn. Soc. 22:60. 1885.

Dissanthelium sclerochloides Fourn. Mex. Pl. 2:112. 1886; Swallen & Tovar, Phytologia 11:373. 1965.

## XYRIDACEAE

XYRIS CACHIMBENSIS L. B. Smith & R. J. Downs, sp. nov.

Caespitosa, acaulis; radicibus crassis; foliis 12-20 cm. longis; vaginis apice abrupte constrictis rotundatisque, ex laminis bene distinctis, 6-7 cm. longis, dense longeque ciliatis; laminis subulatis, longe attenuatis, 0.7-0.9 mm. diametro, punctulatis; scapo 37-47 cm. alto, tereti, glabro, punctulato, 1 mm. diametro; scapi vagina omnino foliacea, longe laminata; spica subglobosa sed basi paulo attenuata, 9-12 mm. longa, multiflora; bracteis infimis reductis; bracteis florigeris in lineis 5 verticalibus ordinatis, late rotundatis, sepala superantibus, aureo-brunneis, mox laceratis, area dorsali magna, ovata, acuta, grisea, corrugata; sepalis lateralibus liberis, subaequilateralibus, spathulatis, 6 mm. longis, apice dense longeque brunneo-pilosis; petalorum laminis late obovatis, 6 mm. longis, aureis; staminodiis longe pilosis; ovario apice excepto triloculari, placentis centralibus. Fig. 1: Sheath apex x 5; fig. 2: Scape section x 5; fig. 3: Spike x 2; fig. 4: Floral bract x 2; fig. 5: Lateral sepal x 2; fig. 6: Ovary section x 5.

BRAZIL: Pará: In campo, Serra do Cachimbo, 9 20' S., 54 53' W., 16-22 May 1955, W. Bokermann 214 (US, type; IAN, SP, isotypes).

Xyris cachimbensis has a type of ovary unknown in the New World until now with all but the extreme apex 3-celled. Its vertically aligned bracts distinguish it from all species south of the Amazon but are similar to those of several species of the Guayana Highland.

XYRIS DOWNSIANA L. B. Smith, sp. nov.

Caespitosa, breviter caulescens; radicibus tenuibus; foliis densissime distichis et laminam frondosam formantibus, ad 23 cm. longis, omnino glabris; vaginis apice obtuso-ligulatis et ex laminis bene distinctis, ca. 5 cm. longis, atro-castaneis, anguste pallido-marginatis; laminis linearibus, planis, acuminatis, 1.5 mm. latis, nervatis punctulatisque, marginibus angustissimis cartilagineis praeditis; scapo 42-49 cm. alto, 0.8 mm. diametro, tereti, ecostato, laevi, punctulato; scapi vagina quam foliis bene breviore, lamina foliacea ad 35 mm. longa praedita; spica anguste ovoidea vel ellipsoidea, basi valde attenuata, apice rotundata, 8 mm. longa, subpauciflora; bracteis infimis reductis et quam alteris angustioribus; bracteis florigeris spiraliter ordinatis, late rotundatis, sepala superantibus, aureo-brunneis, ex sicco plus minusve laceratis, glabris, area dorsali subapicali, ovata, acuta, atro-rubra, linea mediana praedita; sepalis lateralibus liberis, valde inaequilateralibus, ellipticis, obtusis, 3.5 mm. longis, ad apicem versus brevissime ciliatis; in floribus juvenilibus petalorum laminis ellipticis, 3 mm. longis; staminodiis bipartitis, penicillatis; antheris linearibus, retusis, 1.5 mm. longis; placentis perjuvenilibus ignotis. Fig. 7: Sheath apex x 5; fig. 8: Blade apex x 5; fig. 9: Scape section x 5; fig.10: Spike x 2; fig. 11: Lateral sepal x 5.

BRAZIL: Pará: Swampy ground in campo, Rio Tiriós, 14 May 1962, E. Oliveira 1870 (IAN, type).

This new species shows little relationship with any so far recorded from Brazil, but in Maguire and Smith, Botany of the Guayana Highland - Part V, Xyridaceae, Mem. N. Y. Bot. Gard. 10, no. 5:7. 1964, it keys to the vicinity of X. contracta and X. frondosa. It differs from both in its strongly unequal sepals. Xyris downsiana is named in honor of my longtime partner in South American taxonomy, Dr. Robert J. Downs.

## BEGONIACEAE

BEGONIA OLSONIAE L. B. Smith & B. G. Schubert, nom. nov.

Begonia vellozoana Brade, Arquiv. Jard. Bot. Rio de Janeiro 8: 233, pl. 6. 1948, non B. velloziana Walp. Rep. 2:216. 1843.

We are indebted to Mrs. Bee Olson of the "Begonian" for pointing out the necessity of a new name for the above species.

## SOLANACEAE

Due to a lamentable lapse in typification the following species were not validly published before (see International Code of Botanical Nomenclature, Article 37. 1961) and must be dated from the present publication:

CYPHOMANDRA MORTONIANA Smith & Downs, sp. nov.

Described in Phytologia 10:434, pl. 8, figs. 1-6. 1964, without citation of exsiccatae.

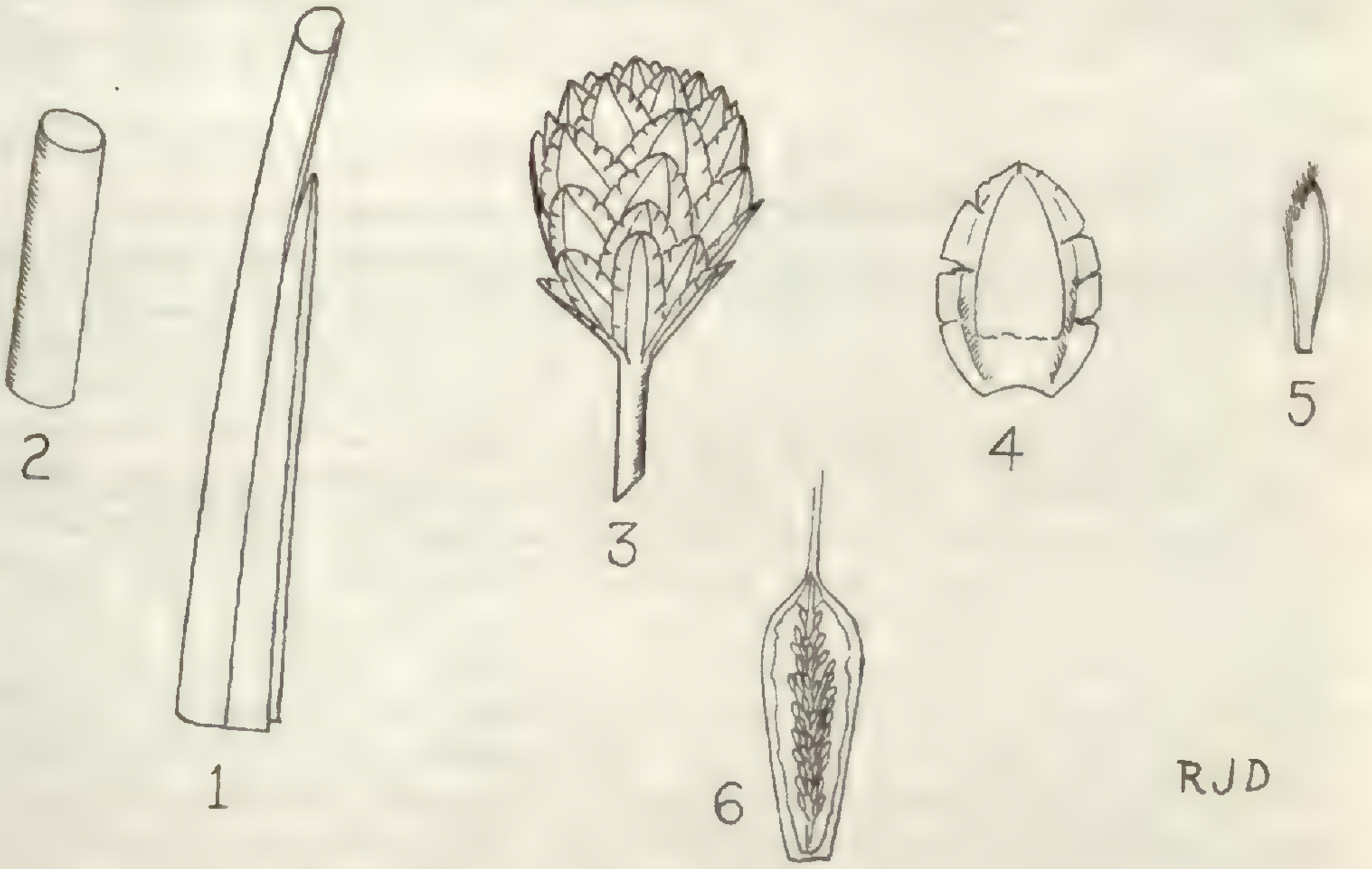
BRAZIL: Santa Catarina: São Joaquim: Ruderal, near Mantiqueira

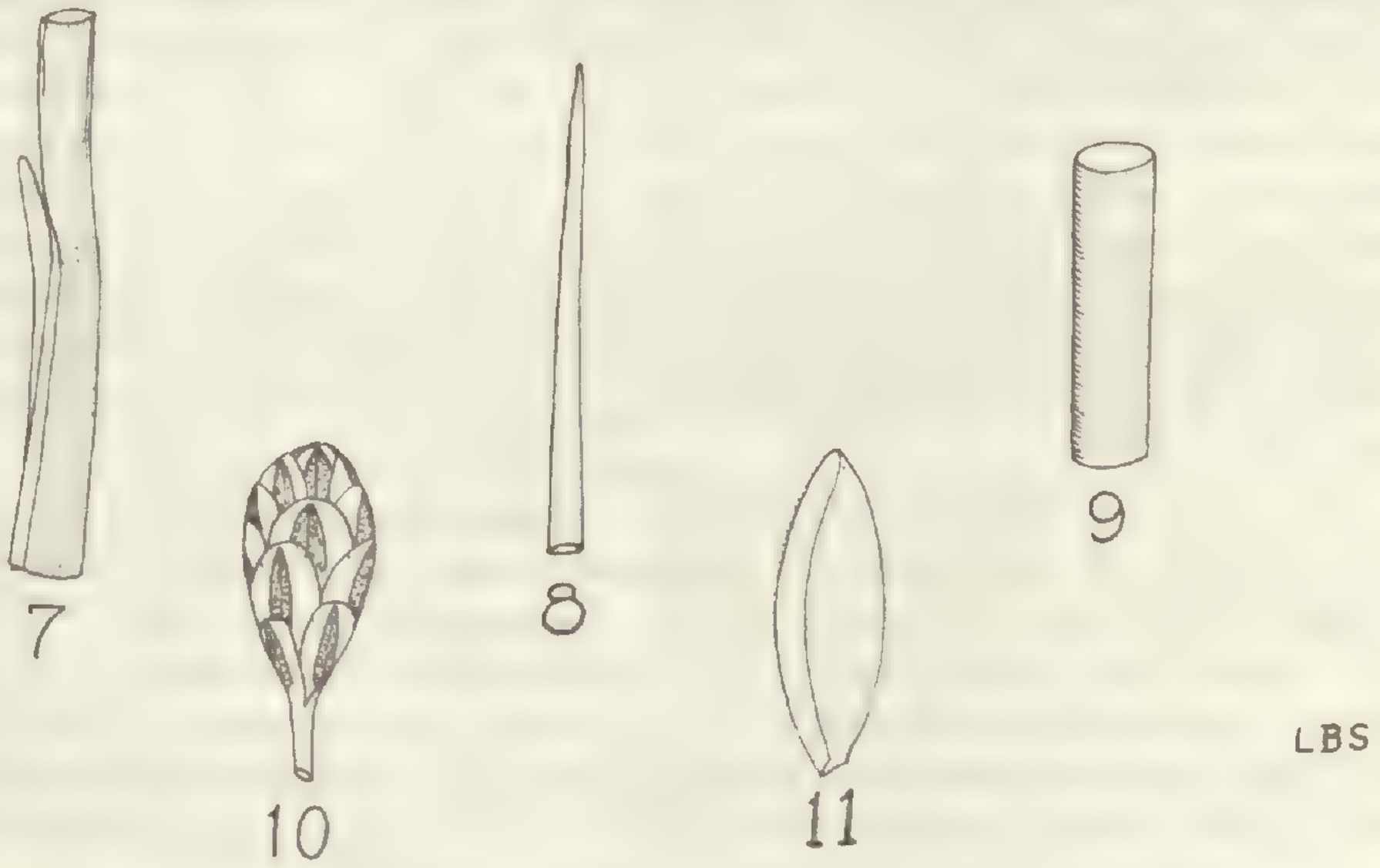
(27 km. east of São Joaquim), alt. 1100-1200 m., 16 January 1957, Smith & Reitz 10219 (US, type; HBR, R, isotypes).

CYPHOMANDRA PATRUM Smith & Downs, sp. nov.

Described in Phytologia 10:435, pl. 9, fig. 1. 1964, but erroneously cited as Reitz 2364 (not a Cyphomandra).

BRAZIL: Santa Catarina: Bom Retiro: In campo, Campo dos Padres, alt. 2000 m., 15 December 1948, Reitz 2364-a (US, type; HBR, isotype).




Figs. 1-6: Xyris cachimbensis; figs. 7-11: X. downsiana

Smithsonian Institution, Washington, D. C.

# MATERIALS TOWARD A MONOGRAPH OF THE GENUS LIPPIA. V

Harold N. Moldenke

LIPPIA LASIOCALYCINA var. SAINTHILAIREI Moldenke

The type specimen is deposited in the United States National Herbarium at Washington. The Eiten & Eiten 4914 originally distributed under this name seems to be L. phryxocalyx Briq.

In all, only 2 herbarium specimens, including the type, of this variety have been examined by me.

Citations: BRAZIL: Minas Gerais: A. Saint-Hilaire s.n. [Oljo d'Agua] (W--2383079--type, Z--isotype).

LIPPIA LASIOCALYX Herzog, Meded. Rijksherb. Leid. 29: 44--45. 1916.

Bibliography: Herzog, Meded. Rijksherb. Leid. 29: 44--45. 1916; A. W. Hill, Ind. Kew. Suppl. 6: 117. 1926; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 40 & 95 (1942) and [ed. 2], 97 & 190. 1949; Moldenke, Résumé 114 & 462. 1959.

Branched shrub, 3--4 m. tall; branches erect, tetragonal, shortly villous-pubescent; leaves decussate-opposite, very short-petiolate or the upper ones subsessile; petioles 2—3 mm. long or obsolete; leaf-blades rather large, firmly chartaceous, broadly ovate, 6.7—6.8 cm. long, about 4.5 cm. wide, acute at the apex, coarsely serrate along the margins, obtuse or rounded at the base and contracted into the petiole, triplinerved at the base, dark-green above, paler beneath, sparsely roughened above with bulbous-based hairs, softly pubescent beneath; inflorescence spicate, aggregate in terminal racemes or panicles, to 15 cm. long; rachis and inflorescence branches tetragonal and villous-pubescent; peduncles 4--5 mm. long; spikes very short-pedunculate, subglobose, 4-quetrous, elongate and loose after anthesis, 1--1.5 cm. long; bractlets rhombic-ovate, about 4 mm. long and 4 mm. wide, subobtuse at the apex, squarrose-spreading, loosely strigose, eglandular, subequaling the corolla; calyx compressed, dilated, 2-carinate, long-villous on the keels, greatly accrescent after anthesis, enveloping the fruit when mature; corolla hypocrateriform, white, its tube short for the genus, about 1.5 mm. long, straight, greatly dilated above the calyx, subglabrous or puberulent above, the limb 5-lobed, the lobes equal, spreading, rounded.

The type of this species was collected by Theodor K. J. Herzog (no. 1851a) at Quebrada de Chajravuaitu, at an altitude of 1600 meters, Bolivia, in April, 1911. Herzog (1916) says "Diese Art wird durch die grob gesägten, sehr breiten Blätter, den endständigen, rispigen Blütenstand, die sparrigen Brakteen und den sehr grossen, plattgedrückten zottigen Kelch, schliesslich durch die auffallend kurze Kronenröhre sehr leicht von den verwandten Arten in der Gruppe Goniostachyum unterschieden."

Nothing is known to me about this species except what is stated in the literature. The original publication reference is given at

the Instituto Miguel Lillo as "Herzog, Bolivia III (1916) 44".

LIPPIA LAXIBRACTEATA Herzog, Meded. Rijksherb. Leid. 29: 45—46. 1916.

Bibliography: Herzog, Meded. Rijksherb. Leid. 29: 45—46. 1916; A. W. Hill, Ind. Kew. Suppl. 6: 117. 1926; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 40, 43, & 95. 1942; Moldenke, Lilloa 8: 424 (1942) and 10: 343 & 378. 1944; Moldenke, Castanea 13: 117. 1948; Moldenke, Alph. List Cit. 2: 377 & 535 (1948), 3: 691 & 909 (1949), and 4: 1293. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97, 105, & 190. 1949; Moldenke, Résumé 114, 125, & 462. 1959; Moldenke, Phytologia 12: 170. 1965.

Medium-sized shrub, 3—4 dm. tall, very much branched; branches obtusely tetragonal, sulcate, the young ones gray-tomentellous; leaves decussate-opposite, petiolate; petioles 1—1.5 cm. long; leaf-blades chartaceous, oblong-elliptic, 5—8 cm. long, 2.2—2.8 cm. wide, rounded or obtuse at the apex, minutely crenate along the margins, obtuse at the base, glandular-tomentellous and reticulate on both surfaces, gray beneath; inflorescence spicate, pedunculate, to 2 cm. long; peduncles 5—10 mm. long, gray-pubescent; spikes to 9 per leaf-axil, nutant or finally downwardly curved, oblong, loosely 4-quetrous; bractlets elongate, 5—7 mm. long, ovate at the base, acuminate at the apex, equaling or slightly surpassing the corolla-tube, subsquarrose, carinate, villous-pubescent; calyx somewhat compressed, elliptic, shortly bifid, puberulent outside; corolla hypocrateriform, mostly white, the tube elongate, about 5 mm. long, honey-colored, somewhat dilated above the middle, puberulent, the limb white, 2-lipped, the lower lip somewhat longer, the lobes all crisped along the margins.

The type of this species was collected by Theodor M. J. Herzog (no. 1108) in thickets and on the campo at Villa Montes on the Rio Pilcomayo, Tarija, Bolivia, in November, 1910. An isotype in the Munich herbarium was photographed by Macbride as his type photograph number 20330. Herzog (1916) says "Aus der Verwandtschaft von L. salviaefolia! Charakteristisch sind die lockeren Aehren und langen, spitzigen Brakteen, wodurch sie sich von allen Arten dieser Gruppe entfernt."

The species has been collected in open dry places in woods, at 1200 meters altitude, flowering in April and November. The original publication reference is given at the Instituto Miguel Lillo as "Herzog, Bolivia III (1916) 45."

In all, 7 herbarium specimens, including type material, and 4 mounted photographs have been examined by me.

Citations: BOLIVIA: Tarija: R. E. Fries 1192 (S), 1592 (N, S); T. Herzog 1108 [Macbride photos 20330] (It--photo of isotype, Kr—photo of isotype, N--photo of isotype, N—photo of isotype, S—isotype, W—photo of isotype); Pflanz 4045 (W—1341230). ARGENTINA: Salta: Schreiter 6699 [Herb. Inst. Miguel Lillo 32707] (N).

LIPPIA LEPIDA Moldenke, Phytologia 2: 315—316. 1947.

Bibliography: Moldenke, Phytologia 2: 315—316. 1947; Moldenke,

Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 93 & 462. 1959.

Dwarf plant, apparently from a woody base, to 15 cm. tall; stems slender, subterete, densely short-pubescent with spreading often gland-tipped hairs, brown macroscopically, but glistening-silvery microscopically; nodes 2--4, not annulate; principal internodes 2.5--5.5 cm. long, or the very lowest abbreviated to 1 cm. or less; leaves 1--4 pairs, decussate-opposite, sessile, elliptic, 7--14 mm. long, 4--8 mm. wide, obtuse at the apex, sharply serrate along the margins, subacute or obtuse at the base, densely short-pubescent above and white-tomentose beneath; inflorescence capitate, usually two at each of the 1 or 2 upper nodes and a single terminal one; peduncles very slender, 1--3.5 cm. long, densely glandular-pubescent like the stems; heads hemispheric, about 1 cm. long and 1.5 cm. wide, densely many-flowered; bractlets large, ovate-elliptic, about 5 mm. long and wide, acute at the apex, glandular-pubescent, overlapping; corolla hypocrateriform, rose, projecting about 5 mm. beyond the bractlets, its limb 5 mm. or more wide.

The type of this little species was collected by Auguste François Marie Glaziou (no. 21891) near the encampment at Corrego do Brejo, Goiás, Brazil, in March or April, 1883, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. In all, 3 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Goiás: Glaziou 21891 (Br--type, F--photo of type, N--isotype, N--photo of type, Si--photo of type, Z--photo of type). Matto Grosso: Pilger 738 (B).

LIPPIA LIBERIENSIS Moldenke, Phytologia 2: 226. 1947.

Bibliography: Moldenke, Phytologia 2: 226 & 331. 1947; Moldenke, Alph. List Cit. 4: 1187. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39 & 190. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 47 & 462. 1959.

Shrub or tree; branches and branchlets obscutely tetragonal or subterete, densely short-pubescent when very young, glabrous in age, light-brownish; nodes annulate; principal internodes 1.5—7 cm. long; leaves decussate-opposite; petioles slender, 3--5 mm. long, densely short-pubescent when very young, very sparsely strigillose or pilosulous when mature, the hairs mostly in 2 bands on the axial surface; leaf-blades firmly membranous, ovate-lanceolate, 2.5--7.5 cm. long, 1.5--3.5 cm. wide, sharply acute at the apex, regularly serrulate from the base to the apex and more or less prolonged into the petiole, densely short-pubescent on both surfaces when young, scabrous and more or less strigose above or subglabrous when mature, irregularly strigillose on the venation beneath and usually more or less pulverulent beneath when mature; inflorescence axillary, capitate, nodding, usually 2 per node near the apex of the branches or branchlets; peduncles very slender, 2--2.5 cm. long, densely short-pubescent or puberulent; heads 1.3—1.6

cm. long, 1.7--2.4 cm. wide, many-flowered; bractlets broadly ovate, the lowest about 1.5 cm. long and almost 1 cm. wide at the base, subacuminate at the apex, densely puberulent.

The type of this little-known species was collected by Alberto Brenes in the vicinity of Liberia, Guanacaste, Costa Rica, in 1910, and is deposited in the Britton Herbarium at the New York Botanical Garden.

In all, 3 herbarium specimens, including the type, have been examined by me.

Citations: COSTA RICA: Guanacaste: Brenes s.n. [Liberia, 1910] (N--type, Si--isotype). Puntarenas: H. S. McKee 11193 (Lw).

LIPPIA LINDMANII Briq., Arkiv Bot. Stockh. 2 (10): 20--21, pl. 4. 1904.

Bibliography: Briq., Arkiv Bot. Stockh. 2 (10): 20--21, pl. 4. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Stapf, Ind. Lond. 4: 125. 1930; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 69. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 666. 1949; Moldenke, Phytologia 5: 95 & 96. 1954; Moldenke, Résumé 93, 114, & 462. 1959.

Illustrations: Briq., Arkiv Bot. Stockh. 2 (10): pl. 4. 1904.

Small shrub or subshrub; stems erect, hexagonal, villosulous with spreading or crisped short hairs, with longer hairs and stipitate glands intermixed; middle internodes about 4 cm. long; leaves ternate, very short-petiolate; petioles 2--5 mm. long, villosulous; leaf-blades rather thick, gray-green above, canescent or gray beneath, ovate-elliptic or subrotund, about 4 cm. long and 3 cm. wide, obtuse or rounded at the apex, regularly crenate along the margins which are often convex below the middle, rounded at the base and confluent into the petiole, rugose, softly velutinous-tomentose or tomentellous on both surfaces, the indument more or less areolate on the upper surface, the teeth 1--1.5 mm. high and 1--3 mm. apart, the venation reticulate, more or less prominulent beneath; inflorescence axillary in the upper leaf-axils, racemose, pedunculate; peduncles short, to 2.5 cm. long, subequaling the upper leaves, villous; heads large, at first subglobose, later ovate or conic-elongate, about 5 cm. long and 3.5 cm. wide; bractlets inflated, thin-membranous or scarious, rose, 6-ranked, subpatulous, closely appressed, broadly ovate, 1.5--2 cm. long, about 1.5 cm. wide, obtuse or shortly acute at the apex, reticulate-venose, loosely villosulous, with glands intermixed, eventually greatly enlarged; calyx very small, ovoid-campanulate, 1.8 mm. long, shortly 4-lobed, spreading long-villous throughout, the lobes ovate, about 0.5 mm. long; corolla hypocrateriform, purple or bright-purple, long-exserted, short-villosulous above, the tube geniculate, slender and cylindric at the base, somewhat ampliate above the bend, 5--7 mm. long to the bend and 5--8 mm. long above it, the throat yellow, the expanded limb surpassing the bractlets, the upper lobes shorter, rounded at the apex, the lateral ones ovate-rounded, the lower one

larger and obcordate, the upper and lateral ones 1.5—2 mm. long, the lower 3 mm. long and 3 mm. wide; stamens and style typical for the genus; fruit not seen.

The type of this distinct species was collected by Carl Axel Magnus Lindman (no. A.3505) — in whose honor it is named — in sandy soil on a shrubby campo at Morro Vermelho near Diamantina, Matto Grosso, Brazil, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. Briquet (1904) says of this plant: "Cette très élégante espèce se place dans la section Rhodolippia près du L. lupulina Cham., dont elle se distingue cependent considérablement par la forme et l'indument des feuilles ternées, les capitules coniformes à la fin, la corolle à tube genicule, etc. Le L. primulina S. Moore a aussi des feuilles largement arrondies, mais le mode de végétation (tiges courtes à entrenoeuds allongés, portant quelques paires de feuilles, sortant d'une grosse souche ligneuse), la forme et les dimensions de capitules, le calice plus tubuleux, le tube corollin à peine incurvé en font un espèce très différente."

Lippia lindmanii has been found on shrubby campos, in sandy soil, and on plateaus in forests, at 200 meters altitude, flowering in May and July. Material has been misidentified and distributed in herbaria as L. lupulina Cham.

In all, 4 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Matto Grosso: Lindman A.3505 (F—photo of type, N—isotype, N—photo of type, S—type, Si—photo of type, Z—photo of type). BOLIVIA: Santa Cruz: Bourke-Borrowes s.n. [Santiago, 1928] (K); Kuntze s.n. [Velasco, 200 m., 7.1892] (W—701989).

LIPPIA LINEARIS H.B.K., Nov. Gen. & Sp. Pl., ed. quart., 2: 262. 1818.

Synonymy: Lippia linearis Humb. apud Spreng. in L., Syst. Veg., ed. 16, 2: 751. 1825. Lippia linearis Humb. & Bonpl. apud Steud., Nom. Bot., ed. 2, 2: 54. 1840. Lippia linearis Humb. & Kunth apud D. Dietr., Syn. Pl. 3: 596. 1843. Lippia linearis Kunth apud Schau. in A. DC., Prodr. 11: 586. 1847.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl., ed. quart., 2: 262. 1818; Spreng. in L., Syst. Veg., ed. 16, 2: 751. 1825; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 596. 1843; Walp., Repert. Bot. Syst. 4: 48. 1845; Schau. in A. DC., Prodr. 11: 586. 1847; Bocq., Adansonia 3: 244. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31 & 95. 1942; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 45. 1947; Moldenke, Alph. List Cit. 2: 573. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 63 & 190. 1949; Moldenke, Résumé 71 & 462. 1959; Moldenke, Résumé Suppl. 8: 5. 1964; Moldenke, Phytologia 12: 24. 1965.

An erect subshrub, about 15 cm. tall, branched; stems suffrutescent, erect; branches tetragonal, glabrous, glaucescent; leaves

decussate-opposite, sessile, connate at the base; leaf-blades rather thick, linear, about 2.5 cm. long, 3--4 mm. wide, acute at the apex, entire, narrowed at the base, appressed-strigose on both surfaces, glaucescent, 1-veined; inflorescence shorter than the leaves, axillary, solitary, pedunculate; peduncles 1 cm. long, angulate, appressed-strigose; heads ovate, about the size of a small pea, bracteate; bractlets ovate-oblong, acute at the apex, shorter than the flowers, pilose on the outside; flowers minute, dense; calyx compressed, bifid, the lobes acute at the apex, pilose on the back; corolla white, the tube equaling the calyx, ampliate above, the limb 2-lipped, flat, the upper lip emarginate-bilobed, the lower lip larger and 3-lobed, the lobes rounded; stamens 4, didynamous, inserted in the corolla-throat, included; style short; stigma obliquely capitate; ovary subovate, glabrous; fruit dry, obovate, the size of a poppy seed, rather compressed, 2-celled, smooth, glabrous, dark, separating into 2 parts, at the bottom of the calyx, the cells 1-seeded.

The type of this puzzling species was collected by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland in sandy places near Cumana, Sucre, Venezuela, flowering in July, and is deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris, where it was photographed by Macbride as his type photograph number 39484.

Schauer (1847) places the species in his Section Zapania, Subsection Axilliflorae. The type was not collected in Colombia as indicated by me in my 1947 publication, where I was misled by the "Index Kewensis" citing it to "N. Granat." The species is known to me only from the literature and the 4 mounted photographs of the type specimen examined by me.

Citations: VENEZUELA: Sucre: Humboldt & Bonpland s.n. [Macbride photos 39484] (It--photo of type, Kr--photo of type, N--photo of type, W--photo of type).

LIPPIA LONGEPEDUNCULATA Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898.

Synonymy: Lippia heterophylla Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 313--314. 1904. Lippia heterophylla var. ciliatifolia Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 314. 1904. Lippia ciliatifolia Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 314, in syn. 1904.

Bibliography: Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 313—314. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 495. 1904; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Lilloa 5: 423 (1940) and 8: 424. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 41, & 95. 1942; Moldenke, Alph. List Cit. 1: 12, 27, 201, & 263 (1946) and 2: 370 & 628. 1948; Moldenke, Lilloa 14: 42 & 43. 1948; Moldenke, Alph. List Cit. 4: 1165. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 99, & 170. 1949; Moldenke, Résumé 93, 116, 461, & 462. 1959; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Troncoso, Darwiniana 12: 258, 259, & 273—275, pl. 3. 1961; Moldenke, Résumé Suppl. 5: 5 & 7 (1962)

and 8: 4. 1964; Moldenke, Phytologia 12: 24. 1965.

Illustrations: Troncoso, Darwiniana 12: 274, pl. 3. 1961.

Dwarf subshrub, 5--40 cm. tall, suffrutescent, dioecious; stems oblique, thick, woody; branches indurated at the base, sparsely pilose toward the apex with antrorse strigose hairs; leaves decussate-opposite, heteromorphous, sessile; lower leaf-blades ovate, usually about 4 cm. long and 2 cm. wide (or smaller), rather acute to more or less obtuse at the apex, rather convex along the margins, rounded at the base, the upper ones considerably narrower, lanceolate, usually about 3 cm. long and 1--1.5 cm. wide (or even more reduced), acuminate at the apex, only somewhat convex (especially below the middle) along the margins, shortly rounded-constricted at the base, all dark-green, rather thickly fleshy, sparsely short-strigose with appressed hairs on both surfaces, not scabrous, penninerved, with a few inconspicuous lateral veins, entire or rarely with 1 or 2 acute teeth on the upper leaves, sometimes beautifully long-ciliate along the margins; inflorescence axillary, very long-pedunculate, many times longer than the leaves; peduncles 3--10 cm. long, slender, tetragonal, short-pilose with antrorse strigose hairs; heads subspheric or spheric-ovoid, 7--12 mm. long, about 7 mm. wide, more or less canescent; bractlets broadly ovate or lanceolate, short-acuminate at the apex, strigose-pubescent or canescent on the outer surface, the lower ones about 4 mm. long and 3--4 mm. wide, slightly surpassing the flowers, the others about equaling the flowers; flowers of 2 types, functionally staminate and pistillate; calyx minute, usually less than 1 mm. long, campanulate, densely strigose-pubescent outside during anthesis, obscurely subbilabiate, the lobes subentire; corolla hypocrateriform, yellow to orange or rose, sometimes partly red and partly yellow or at first yellow and finally orange, exserted 2--3 mm. from the calyx, the tube densely puberulent above, the limb densely puberulent, the lobes ovate, small, the anterior one larger; pyrenes large, about 2 mm. long and 1.5 mm. wide, separating with the closely appressed and densely whitish-tomentose calyx segments.

The type of this interesting species was collected by Carl Ernst Otto Kuntze at Concepcion, Paraguay. The type of L. heterophylla and its variety ciliatifolia was collected by Benedict Balansa (no. 1038) in hard sand at Campo Grande between Lugue and La Trinidad, Paraguay, on May 12, 1875, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where it was photographed by Macbride as his type photograph number 24654.

Briquet (1904) says of his plants: "Cette remarquable espèce se place à côte du L. longepedunculata O. Kuntze.....dont elle possède les capitules très longuement pédonculés, et les feuilles entières très peu charnues et à nervation peu apparente. Mais elle s'en écarte complètement par ses feuilles hétérophylles, ses bractées ovées (et non pas lancéolées). M. O. Kuntze, dont la description est d'ailleurs insuffisante, en tous cas beaucoup trop sommaire, ne dit rien du calice, ce qui nous faire croire que

le L. longepedunculata ne possède pas les remarquables calices tomenteux du L. heterophylla. L'auteur compare son espèce à un 'L. graminifolia', espèce qui nous est inconnue. Peut-être est-ce la un lapsus pour 'angustifolia'. M. Kuntze a malheureusement négligé de nous dire de quel auteur était ce L. graminifolia."

Of the variety ciliatifolia he says: "Nana, foliis secus margines pulchre longeque ciliatis. Capitula minus canescentia. Bracteae angustiores, extus potius strigoso-pubescentes quam canescentes. Calix sub anthesi strigoso-pubescens, maturus ignotus. Cette plante curieuse ne nous est connue que par un petit échantillon mélangé avec L. heterophylla. Peut-être s'agit-il la d'une espèce différente (c'était notre premier impression), mais les materiaux sont insuffisants pour qu'on puisse se faire une opinion raissonée à ce sujet. C'est une forme qui mérite d'être recommandée à la solicitude des collecteurs."

Troncoso (1961) says: "Briquet, al describir su L. heterophylla, señala su gran afinidad con L. longepedunculata O. Ktze. Sin embargo, la diferencia de esta especie por la heterofilia y por sus brácteas ovales (lanceoladas en L. longepedunculata). Además, hace notar que O. Kuntze en su diagnosis no se refiere para nada al cáliz, lo que hace sugerir que dicha especie no posee el notable cáliz tomentoso de L. heterophylla. El estudio detenido del tipo de L. heterophylla me ha permitido descubrir que se trata de una especie dioica. El ejemplar Balansa 1038, del Herb. de Ginebra, es ♀ y sus caracteres florales coinciden en un todo con la descripción de O. Kuntze. En cambio el ejemplar Hassler 7347, del mismo herbario, posee pies ♂ y ♀, las flores ♂ presentan brácteas lanceoladas y su cáliz está reducido a dos pequeñísimas escamitas, inconspícuas, membranáceas.....Esto indicaría porque no fue observado por O. Kuntze y de ahi su falta de mención del mismo. Probablemente su ejemplar era ♂. En cuanto al carácter de la heterofilia señalado por Briquet para su L. heterophylla, éste es poco marcado y puede muy bien haber pasado desapercibido por O. Kuntze.....Estas observaciones de los ejemplares ♂ y ♀ me permiten establecer esta sinonimia con bastante fundamento, a pesar de no haber visto el tipo de L. longepedunculata O. Kuntze."

It should be noted that the bibliographic reference, Briq. in Chod. & Hassler, Plant. Hassler. 2 (11): 495, is cited in the Instituto Miguel Lillo as "Plantae Hasslerianae XI (1904) 495."

The species has been found growing in hard sand and in sandy fields, flowering in January, February, May, September, and November. Anisits describes it as "very common on the campo". The flowers are described as "petals yellow or rose" on T. Rojas 2540, "petals partly red, partly yellow" on Hassler 7347, and "at first yellow, later orange" on Anisits 2531. Material has been misidentified and distributed in herbaria under the name Lantana turneriifolia Cham. Troncoso (1961) cites from Paraguay: Balansa 1038 (Cb); Hassler 2592 (Bm, Cb, K, P), 7347 (Bm, Cb, K, P, X); T. Rojas 2540

(Si).

In all, 18 herbarium specimens and 9 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: BRAZIL: Matto Grosso: Archer & Gehrt 91 (N, Sp—364148, W—1740790). PARAGUAY: Anisits 2531 (S); Balansa 1038 [Macbride photos 24654] (It—photo, Kr—photo, N—photo, N—photo, W—photo); Fiebrig 4773 (Cb, Cb, N, N—photo, Z—photo); Hassler 1234 (N), 2592 (N, N—photo, V, Z—photo), 7347 (Ca—944343, Mi, N, N, S); Kuntze s.n. [Concepcion de Paraguay] (N—isotype); T. Rojas 2540 [Herb. Osten 18189] (Ug), s.n. [Hassler 2592] (S).

LIPPIA LOPEZII Moldenke, Phytologia 9: 187. 1963.

Bibliography: Moldenke, Phytologia 9: 187. 1963; Moldenke, Résumé Suppl. 7: 4. 1963; Hocking, Excerpt. Bot. A.7: 454. 1964; Moldenke, Biol. Abstr. 45: 2772. 1964; Soukup, Biota 5: 194. 1964.

Small shrub, apparently considerably branched; branches slender, brownish, obtusely tetragonal and margined, striate-sulcate between the angles, minutely puberulent; branchlets very slender, tetragonal, margined, puberulent; principal internodes rather uniformly 1—1.5 cm. long; leaves decussate-opposite, sometimes somewhat fasciculate, sessile or subsessile, thick-textured, obovate, 6—10 mm. long, 3—4 mm. wide, obtuse or subacute and sparsely denticulate at the apex, rather cuneately narrowed and entire at the base, minutely white-strigillose on both surfaces, rather more densely so beneath; midrib usually impressed above and prominulent beneath, the remainder of the venation obscure; inflorescence axillary, opposite, sessile or subsessile, capitate, many-flowered, grayish-puberulent throughout; corolla hypocrateriform, about 5 mm. long, white, densely white-strigose outside.

The type of this rare species was collected by H. Arnaldo López Miranda -- in whose honor it was named -- and A. Sagástegui A. (no. 3426) on a dry rocky slope between Huaylillas and Tayabamba, in the province of Pataz, La Libertad, Peru, at an altitude of 2350 meters, on May 21, 1961, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York. The species is known thus far only from the type specimen.

Citations: PERU: La Libertad: López Miranda & Sagástegui 3426 (Z—type).

LIPPIA LORENTZII Moldenke, Alph. List Invalid Names Suppl. 1: 14, hyponym (1947), Phytologia 2: 415. 1948.

Synonymy: Lippia geminata var. lanceolata Griseb., Abhand. Königl. Gesell. Wissen. Götting. 24: [Symb. Fl. Argent.] 278. 1879. Lippia globiflora η lanceolata Griseb. ex Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898. Lippia globiflora η lanceolata f. incana Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898. Lippia globiflora var. lanceolata Griseb. ex Moldenke, Carnegie Inst. Wash. Publ. 522: 165, in syn. 1940. Lippia globiflora var. lanceolata f. incana Kuntze ex Mol-

denke, Lilloa 5: 419, in syn. 1940. Lippia globiflora \ lanceolata (Griseb.) Kuntze ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia geminata var. lanceolata f. incana Kuntze ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947.

Bibliography: Griseb., Abhand. König. Gesell. Wissen. Gütting. 24: [Symb. Fl. Argent.] 278. 1879; Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898; Moldenke, Carnegie Inst. Wash. Publ. 522: 165. 1940; Moldenke, Lilloa 5: 419. 1940; Moldenke, Alph. List Invalid Names Suppl. 1: 14. 1947; Moldenke, Phytologia 2: 415. 1948; Moldenke, Castanea 13: 118. 1948; Moldenke, Lilloa 14: 44. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 190. 1949; Moldenke, Alph. List Cit. 3: 673. 1949; Troncoso, Darwiniana 10: 78—80, fig. 4. 1952; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 125, 312, & 462. 1959; Moldenke, Résumé Suppl. 7: 6 (1963) and 11: 7. 1964.

Illustrations: Troncoso, Darwiniana 10: 79, fig. 4. 1952.

Small shrub, about 60 cm. tall, branched from the base; stems apparently much branched and irregular, gray; branches cylindric, gray and glabrous below, obscurely tetragonal and subcanescent toward the apex; branchlets slender, obtusely tetragonal, canescent-strigillose; nodes rather indistinctly annulate; principal internodes abbreviated or medium in length, 0.5—6 cm. long; leaves decussate-opposite or rarely ternate, often clustered on very short twigs; petioles very slender, 1—7 mm. long or obsolete, densely canescent-strigillose; leaf-blades small, lanceolate-elliptic or elliptic-lanceolate, 0.5—4.6 cm. long, 3—18 mm. wide, acute at the apex, uniformly serrulate or acute-serrate almost to the long-attenuate or cuneate base, densely canescent-strigillose or incanous-pubescent on both surfaces, triplinerved, the teeth generally with revolute margins, the slender midrib and secondaries more or less impressed above and very prominent beneath; inflorescence axillary, 1 per leaf-axil, 2 per node; peduncles very slender, 4—10 mm. long, densely pubescent or canescent-strigillose; spikes elongate-capitate, about 1 cm. long in anthesis, oval to subcylindric and to 1.8 cm. long in fruit; bractlets oval or ovate, concave, imbricate in many series, 2.5—5.6 mm. long, 1.8—2.2 mm. wide, acuminate at the apex, 1—3-veined, densely pubescent or canescent-strigose and ciliate; calyx 2-lipped, obscurely and irregularly 1- or 2-dentate, densely pubescent, persistent in fruit, easily separating into 2 halves; corolla hypocrateriform, lilac, 4—5.5 mm. long, 2-lipped, puberulent outside, the lower lobe recurved, 3-lobulate, the central lobule crisped, the lateral ones smaller, subtriangular, the upper lobe about half as long, plainly 2-lobulate, the tube ampliate toward the apex, pubescent on the outside above; stamens 4, didynamous, included, inserted at the middle of the corolla-tube; stigma apical, oblique; ovary oval, glabrous, 2-celled, each cell 1-ovulate; fruit dry, obovoid, 2—2.2 mm. long, 1.8—2 mm. wide, glabrous, covered by the persistent calyx, the pericarp dilated on the upper half to form a soft, spongy tissue, the lower half for-

tile, narrowed, osseous; seeds small, oval, without endosperm.

The type of this species was collected by Paul Günther Lorentz -- in whose honor it was named -- and Georg Hans Emmo Wolfgang Hieronymus at Dragones, Salta, Argentina, in the middle of August, 1873, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The type of L. globiflora ɳ lanceolata f. incana was gathered by Hieronymus at Oran, Salta, Argentina, and is described by Kuntze merely as "Folia utrinque incana". The type of L. geminata var. lanceolata is Lorentz & Hieronymus 580 from Salta.

Regarding the spongy tissue on the fruit, Troncoso (1952) says: "Ese tejido esponjoso hace al fruto muy liviano, facilitando su diseminación, pues flota fácilmente en el agua." She also notes that "El ejemplar que sirvió a Moldenke para describir la especie, cuyo isotipo se halla en el Museo de Córdoba, es muy pobre, aparentemente comido por animales. Se halla formado totalmente por ramitas muy breves, con hojas reducidas y agrupadas. Habiendo podido estudiar un ejemplar completo, no mutilado (Burkart 6792), he considero útil dar una descripción emendada de la especie, ampliando además el área de distribución conocida. El material examinado, que incluye un isotipo de Lippia geminata var. lanceolata Gris., me ha permitido establecer la identidad de dicha variedad con la especie de Moldenke, la cual indudablemente es muy vecina de Lippia geminata O. Ktze. Lippia Lorentzii pertenece a la Secc. Zapania Sch., caracterizada por presentar capítulos que se alargan durante la floración, brácteas imbricadas, pluriseriadas, cóncavas o planas, que cubren el cáliz, éste brevemente tubuloso, membranáceo, comprimido-carenado pero no alado." She cites from Corrientes: Burkart 6792 (Si) and from Salta: Lorentz & Hieronymus 580 (Cd), s.n. [Bei Dragones, Mitte VIII, 1873] (Cd-isotype); Venturi 5124 (Si).

Most of the Grisebach and Kuntze trinomials and quadrinomials cited in the synonymy above were hitherto regarded by me in previous publications as applying to the polymorphic L. alba (Mill.) N. E. Br.

In all, 5 herbarium specimens, including the types of most of the names involved, and 8 mounted photographs have been examined by me.

Citations: ARGENTINA: Salta: Lorentz & Hieronymus s.n. [Bei Dragones, Mitte VIII, 1873] (Ag--photo of isotype, F--photo of type, F--photo of isotype, N--isotype, N--isotype, N--photo of type, N--photo of isotype, S--type, Si--photo of type, Ug--isotype, Z--photo of type, Z--photo of isotype); Venturi 5124 (W--1591459).

LIPPIA LUCENS Standl., Trop. Woods 37: 30--31. 1934.

Bibliography: P. C. Standl., Trop. Woods 37: 30--31. 1934; A. W. Hill, Ind. Kew. Suppl. 9: 161. 1938; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 20 & 95. 1942; Moldenke, Phytologia

2: 384. 1947; Moldenke, Alph. List Cit. 2: 351 (1948), 3: 973 (1949), and 4: 1152 & 1255. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 35, 37, & 190. 1949; Moldenke, Phytologia 5: 95. 1954; Moldenke, Résumé 42, 44, & 462. 1959.

Branched aromatic shrub or small tree, to 6.9 m. tall; trunk to 10 cm. in diameter; branches slender, subterete, brown, scabrous-hirtellous and densely elevated-punctate; principal internodes half as long as the subtending leaves; leaves medium in size, short-petiolate; petioles heavy, 3--7 mm. long; leaf-blades coriaceous, firm and stiff, dark-green above, paler beneath, elliptic-oblong or lanceolate-oblong, 7--9 cm. long, 2--3 cm. wide, narrowed to the acute or subobtuse apex, crenate and more or less revolute-margined, cuneate-attenuate and decurrent into the petiole at the base, bullate-rugose and shiny, roughly hirtellous-scabrous above, viscid-puberulent beneath and roughened especially on the hirtellous-scabrous venation, the venation deeply impressed above, conspicuously prominent beneath; inflorescence very short-spicate, two in the leaf-axils; peduncles slender, 2--2.5 cm. long, hirtellous-scabrous and glandular-puberulent; spikes capitate, 10--12 mm. long and almost as wide; bractlets broadly ovate or rounded-ovate, acuminate at the apex, slightly scabrous or subglabrous, scabrous-ciliate along the margins, the lowest to about 8 mm. long, the upper gradually smaller, hardly accrescent after anthesis; calyx 2 mm. long, densely hirtellous, the teeth very short, triangular, acute at the apex; corolla hypocrateriform, pale-yellow; fruit broadly obovoid, 1.8 mm. long, 2-sulcate, smooth, shiny.

The type of this species was collected by J. B. Edwards (no. P.514) at an altitude of 1110 meters in an open mountain forest at Siguatepeque, Comayagua, Honduras, on November 10, 1932, and is sheet number 686991 in the herbarium of the Chicago Natural History Museum, with an isotype in the herbarium of the Arnold Arboretum in Cambridge, Massachusetts.

Standley says of this species "Of the alliance of Lippia umbellata Cav., a group badly in need of critical revision; apparently a form worthy of specific rank, and at least unlike any other Mexican or Central American material that has come to the writer's attention." It has been collected on streambanks, the lower slopes of cloud forests, in open mountain woods, and in wet ravines, at altitudes of 1110 to 1500 meters, flowering in July and August, fruiting in November. Material has been misidentified and distributed in herbaria under the names L. kellermanii Greenm. and L. substrigosa Turcz. A note on the Gray Herbarium isotype indicates that there is a specimen of this collection in the Wood Collection there. Standley 26473 exhibits a number of insect galls.

In all, 18 herbarium specimens, including type material, and 6 mounted photographs have been examined by me.

Citations: GUATEMALA: Chiquimula: Steyermark 31596 (F--1039553, N--photo, Z--photo). HONDURAS: Choluteca: Williams & Molina R.

10802 (G). Comayagua: J. B. Edwards 514 (F--photo of isotype, G-isotype, N--photo of isotype, N--photo of isotype, S--isotype, Z-photo of isotype); Yuncker, Dawson, & Youse 6003 (G, S, St), 6387 (G, N, S). Morazán: Molina R. 549 (G), 568 (G), 1134 (G), 1456 (G), 1837 (G), 3213 (G); P. C. Standley 13668 (N), 26473 (G).

LIPPIA LUPULIFORMIS Moldenke, Phytologia 2: 470. 1948.

Bibliography: Moldenke, Phytologia 2: 470 & 483 (1948) and 3: 137 & 138. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 117, 118, 122, & 190. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 145, 146, 154, 314, & 462. 1959.

Shrub or subshrub, to 1.5 m. tall; branchlets slender, acutely tetragonal and grayish, pustulate-asperous, the younger parts and twigs rather densely substrigose with whitish bulbous-based hairs and densely resinous-granular, brownish; leaf-scars elevated on conspicuous divergent sterigmata; buds densely white-villous; nodes annulate on the young twigs, not annulate on older branches; principal internodes 1.2--3.2 cm. long on older branchlets, abbreviated to 2--9 mm. on twigs; leaves decussate-opposite or rarely ternate or approximate; petioles slender, 1--5 mm. long, rather densely substrigose-villosulous and resinous-granular, margined, deeply canaliculate above; leaf-blades chartaceous, dark-green above, lighter beneath, ovate, 1.7--3.5 cm. long, 0.9--2 cm. wide, rounded or subacute at the apex, acute or acuminate at the base or sometimes rounded, very scabrous and bullate above, densely short-pubescent on both surfaces, densely resinous-gramular beneath, uniformly serrate-dentate from the base to the apex, the teeth often decidedly revolute-margined; midrib impressed above, prominulous beneath; secondaries very slender, about 5 per side, ascending, hardly arcuate, impressed above, prominulous beneath; vein and veinlet reticulation abundant, usually deeply impressed above and prominulous beneath; inflorescence spicate, axillary, surpassing the subtending leaf, 1 or 2 per node; peduncles slender, 4--6.5 cm. long, asperous-hirsutulous and resinous-gramular, tetragonal; spikes at first capitate, later elongating to 2 cm., 1.5--2 cm. wide, strobiliform, densely many-flowered; bractlets large and conspicuous, densely imbricate, ovate, 8--10 mm. long, 4--7 mm. wide, acute or subacuminate at the apex, rather sparsely strigillose and granular; corolla white, the tube 6--7 mm. long, densely gray-pubescent on the outside, the limb 4--5 mm. wide.

The type of this species was collected by H. Rudatis (no. 1145) at G'Mermum, at an altitude of 650 meters, Dumisa, in the district of Alexandra, Natal, South Africa, on September 11, 1910, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The plant is said by the Hornbys to be "common" in deciduous scrub in Tanganyika. It has been found in deciduous woods at altitudes of 650 to 1600 meters, flowering in January, March, September, November, and December. Material has been misidentified and distributed in herbaria under the names L. asperifolia A. Rich., L. plicata J. G. Baker, and L. somalensis Vatke.

In all, 8 herbarium specimens, including the type, and 5 moun-

ted photographs have been examined by me.

Citations: TANGANYIKA: Hornby & Hornby 574 (K); A. Peter 580 [O.I.19] (B), 2122 [O.I.54] (B), 51797 [O.54] (B). KENYA: Dümmer 5046 (K). ANGOLA: Huíla: E. Santos 105 (Ul). SOUTH AFRICA: Natal: Rudatis 1145 (F--photo of type, K--photo of type, N--isotype, N--photo of type, S--type, Si--photo of type, Z--photo of type).

LIPPIA LUPULINA Cham., Linnaea 7: 222--223. 1832.

Synonymy: Lippia clausseni Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863. Lippia neriifolia Turcz. ex Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 100, in syn. 1877. Lippia claussenii Turcz. apud Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894. Lippia bracteata Clausen ex Moldenke, Alph. List Invalid Names Suppl. 1: 13, in syn. 1947 [not L. bracteata Carr., 1881, nor Hort., 1894]. Lippia lupulina Cham. & Schlecht. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Verbena lupulina Cham. ex Moldenke, Alph. List Cit. 2: 448, sphalm. 1948. Lippia lupulina var. minor Löfgr. ex Moldenke, Résumé 314, in syn. 1959. Rhodolippia lupulina Cham. ex Moldenke, Résumé 343, in syn. 1959. Lippia lupulina Charm. ex Moldenke, Résumé Suppl. 10: 6, in syn. 1964.

Bibliography: Cham., Linnaea 7: 222—223. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 297. 1843; Walp., Repert. Bot. Syst. 4: 46. 1845; Schau. in A. DC., Prodr. 11: 592. 1847; Schau. in Mart., Fl. Bras. 9: 248. 1851; Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863; Bocq., Adansonia 3: 244. 1863; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 100. 1877; Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 279. 1879; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 252. 1898; Briq. in Chod., Bull. Herb. Boiss., sér. 2, 2: 820. 1902; Briq. in Chod., Pl. Hassler. 1 (9): 199. 1902; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 316. 1904; Briq., Arkiv Bot. Stockh. 2 (10): 21. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 499. 1904; Hayek, Denkschr. Kaiser. Akad. Wissen. Math.-nat. 79: 296. 1908; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Molfino, Not. Bot. 2: 103. 1923; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 40, 41, & 95. 1942; Moldenke, Alph. List Cit. 1: 12, 27, 56, 90, 97, 106, 121, 171, 177, 196, 230, 238, 241, 255, 263, 289, & 290. 1946; Moldenke, Alph. List Invalid Names 13, 14, & 25. 1947; Moldenke, Phytologia 2: 386. 1947; Moldenke, Lilloa 14: 44. 1948; Rawitscher, Journ. Ecol. 36: 245 & 248. 1948; Moldenke, Alph. List Cit. 2: 362—370, 441, 448, 484, 485, 532—535, 550—553, 598, & 600 (1948), 3: 669, 670, 674, 689, 704, 751, 754, 764, 814, 816, 837, 838, 845, 847, 848, 856, 885, 921—923, 947, & 969 (1949), and 4: 1064, 1075, 1081, 1094, 1123--1125, 1132, 1134, 1135, 1153, 1165, 1167, 1180, 1203, 1204, 1221, 1235, 1247, 1249—1251, 1257, 1296, 1300, & 1302. 1949; Moldenke, Known Geogr. Dis-

trib. Verbenac., [ed. 2], 80, 97, 99, 105, 189, & 190. 1949; Rawitscher, Bol. Univ. São Paulo Fac. Filos. C (7): 44. 1949; Moldenke, Phytologia 3: 287. 1950; Stellfeld, Trib. Farmac. 19 (10): 169. 1951; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 348. 1951; Angely, Fl. Paran. 7: 12. 1957; Moldenke, Résumé 93, 114, 116, 125, 311, 314, 343, 369, 461, & 462. 1959; Moldenke, Résumé Suppl. 1: 6, 19, & 25. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Angely, Fl. Paran. 16: 60 (1960) and 17: 46. 1961; Troncoso, Darwiniana 12: 258 & 259. 1961; Moldenke, Phytologia 8: 136. 1961; Moldenke, Résumé Suppl. 6: 6 (1963), 8: 4 (1964), and 10: 6. 1964; Moldenke, Phytologia 12: 24, 111, 160, & 165--167. 1965.

Perennial herb, semi-woody subshrub, or shrub, 30 cm. to 1.5 m. tall, summer-green, shallow-rooted, softly tomentose or villous throughout, with glanduliferous hairs intermixed; rootstock woody, turnip-shaped; stems very small, simple or branched above; branches obsoletely tetragonal; leaves decussate-opposite, sessile or short-petiolate; leaf-blades very variable in size and shape, ovate or broadly ovate to subrotund, usually 4--7.5 cm. long, 2.5--6.5 cm. wide, sometimes only 1.8 cm. long and 1.2 cm. wide, cordate or rounded to acute at the base, serrate or crenate-serrate along the margins, lineate-venose and rugose above, tomentose with velutinous or villous to hirtellous tomentum, with scattered or abundant glanduliferous hairs intermixed; peduncles stiff, axillary and solitary or congested-paniculate at the apex of the branches; heads hemispheric or subglobose during anthesis, about the size of a cherry at the start of anthesis and then with some of the larger exterior bracts involucrate, later about the size of a walnut and with all the bracts much enlarged; bracts broadly-ovate, equally imbricate, membranous, varying from lilac, purple, violet, or "red-blue" to red, rose, or pale-pink, equaling or surpassing the flowers during anthesis, many-veined, pli-nerved, venose-reticulate, later increasing in size, often very wide, acuminate or finally acute at the apex, ciliate along the margins, pubescent; calyx bifid, very hirsute, the lobes obtusely 2-toothed; corolla hypocrateriform, varying from rose, rose-red, rose-lilac, or clear-rose, red, Bordeaux red, pink, or bright-pink to lavender, light-purple, purple, purple-violet, violet, lilac, "red-blue", "orchid-color", or blue, sometimes described [erroneously?] as yellow or white, more accurately as "lilac with the entrance to the tube yellow" or "with white limb and yellow throat", the tube 8 mm. long, curvate, ventricose below the middle and there bearing the didynamous stamens, broad, glandular-villous on the outside, pubescent in the throat, the limb 6 mm. wide, lightly velutinous, the lowest lobe subrotund, the others shorter; anthers with linear thecae, extrorsely arcuate; style and fruit typical of the genus, the latter winged by the adherent calyx, obcordate.

The type of this handsome and well-known species was collected by Friedrich Sellow (no. 2331) somewhere in Brazil and was deposited in the herbarium of the Botanisches Museum in Berlin, where it was photographed by Macbride as his type photograph num-

ber 17523, but is now destroyed. Lippia clausseni is based on an unnumbered collection made by Peter Clausen -- in whose honor it was named -- in Minas Gerais, Brazil; L. bracteata Guil. is based on P. Clausen 609, also from Minas Gerais, deposited in the Britton Herbarium at the New York Botanical Garden, while L. bracteata Clausen is based on an unnumbered collection made between "Aug." [1839?] and "April 1840" in the same state by the same collector and deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. Lippia lupulina var. minor is based on Löfgren s.n. [Herb. Com. Geogr. & Geol. 154; Herb. Inst. Bot. S. Paulo 15655], collected in São Paulo, Brazil, and deposited in the Britton Herbarium.

Schauer (1847) classifies L. lupulina in his Subsection B of Section Rhodolippia; Troncoso (1961) places it in her Subgenus Lippia, Section Rhodolippia.

Clausen's surname is often spelled "Claussen" in literature and on herbarium sheets.

Reiss says of this species "does not grow high, about 30 cm. at most". Schauer (1851) says: "Frutex pedalis--tripedalis, modo simplex, modo superne ramosus, in campis adhuc non crematis; in campis superrime crematis suffrutex vel herba (Riedel). Variat maximopere foliorum figura et amplitudine, nec non tomento magis velutino vel magis villoso vel magis hirtello, pilis glanduliferis copiosioribus et rarioribus.....Antherae didymae loculis linearibus extrorsum arcuatis. Stylus et fructus Lippiarum; hic calyce adhaerente velatus, obcordiformis. -- Quoad indumentum, foliorum et capitulorum magnitudinem eximie variat. Specimina alia villis longis canescunt; alia imprimis vetula et macra fere omnino calvescunt; alia pube tenera aequali mollescunt."

The plant has been found in fields, waste places, campos, dry or natural campos, high sandy uncultivated campos, campo cerrado, moist meadows, iron ore or Attalea palm areas, mato, and cerrado, on hills, and at the margins of woods, at altitudes of 425 to 1600 meters, flowering in every month of the year, fruiting in November. Mexia describes it as "occasional among tall grass", the Eitens found it in "cutover and burned campo cerrado, ground plowed for planting of pines, ground vegetation returning, grasses, herbs, small shrubs; soil poor, reddish-brown fine sand with a little clay", and Hassler encountered it on "collines pierreuses et incultes". Schauer (1851) says: "Crescit in copiose campis siccis graminosis petrorisque". Rawitscher (1948) refers to it: "For instance, Lippia lupulina, as I. Schauer, the author of the Verbenaceae in Martius' Flora, points out, is herb-like when collected in Campos that recently have been burnt, but where for a longer time fire has been excluded, it is a shrub."

As to the flower color, the flowers are described as "lavender or light-pink" on Reiss 12; "lilac" on Herb. Inst. Bot. S. Paulo 36774, 36780, & 37031; "violet" on Mendes Magalhães 1510; "purple-violet" on Hassler 7261; "red" on Hertel 7; "clear-rose" on Herb.

Inst. Bot. S. Paulo 3051; "rose" on Herb. Inst. Bot. S. Paulo 3632, 5321, & 23408, Kuntze s.n., J. E. Oliveira 1314, A. G. Schulz 7105, and Williams & Assis 5810, 6108, 6211, & 6618; "rose or rose-red" on Jörgensen 4585; "blue" on Williams & Assis 6273; "purple" on Assis 114, Eiten & Eiten 2273, L. O. Williams 5386, and Williams & Assis 5851; "Bordeaux red" on Anisits 2610; "pink" on Brade 5768; "red-blue" on Pickel 2724; "bright-pink" on Mexia 5871; "rose or lilac" on Machado de Campo 72; "rose-lilac" on Herb. Inst. Bot. S. Paulo 2476; "orchid-color" on Swallen 9518; "lilac with entrance to tube yellow" on Macedo 482; "white" on Herb. Inst. Bot. S. Paulo 36447; "white limb and yellow throat" on Pickel 2724; and "yellow" on Mendes Magalhães 4319 and Williams & Assis 6310, 6477, & 7099. I am wondering whether in some of these cases the collector isn't referring to the color of the bracts rather than of the corollas.

Glaziou 21902 does not look at all typical of this species, but is so cited by Glaziou (1911). It is obviously conspecific with Malme 1996 and 1996a, having tiny leaves, small heads, and big flowers. Malme 1996b & 1996c have the leaves more normal, but the heads are still small and the flowers large. Machado de Campo 72 does not appear to be typical either -- some of the leaves are oblong in shape!

Material of this species has been misidentified and distributed in herbaria under the names L. bracteosa Mart. & Gal., L. primulina S. Moore, and Melasanthus sp. On the other hand, the Urbina s.n. [Enero de 1886], distributed as L. lupulina, is L. callicarpaefolia H.B.K.; G. Gehrt s.n. [Herb. Inst. Bot. S. Paulo 4037] is the type collection of L. francensis Moldenke; G. A. Black 51-10973 and Regnell III.946 [7/1855] are L. gehrtii Moldenke; and Kuntze s.n. [Velasco, 200 m., 7.1892] is L. lindmanii Briq. Mulford & Foster 713 is a mixture with L. florida Cham.

Schauer (1851) cites collections by Lund, Martius, and Riedel from São Paulo, Brazil, by Sellow, Martius, Pohl, Riedel, Clausen 1034, and Vauthier 195 from Minas Gerais, by Pohl from Goiás, and by Lhotsky from Matto Grosso. He also cites the species from Chiquitos, Bolivia, but gives no collector's name. Hayek (1908) cites Campos Novaes s.n. [Campo Botucatu, XI.1896], Wacket s.n. [prope S. Caetano haud procul ab urbe Sao Paulo, 750—800 m.s.m.], and Wettstein & Schiffner s.n. [prope urbem Faxina, ca. 650 m.s.m. VIII.1901] from São Paulo. Stellfeld (1951) cites Freitas s.n. [Palmeira, Nov. '36; Herb. Paran. 3334], Stellfeld s.n. [Vila Velha, Out. '44; Herb. Paran. 1962], and Tessmann s.n. [Ponta Grossa, Lagoa Dourada, 7-2-48; Herb. Mus. Paran. 2999] from Paraná.

In all, 243 herbarium specimens and 7 mounted photographs, including type material or phototypes of most of the names involved, have been examined by me.

Citations: BRAZIL: Amazonas: J. G. Kuhlmann s.n. [Rio Tapajóz, Salto Iris, Jan. 1915; Herb. Comm. Linhas Telegr. 1302] (Sp--31978). Brasília: Heringer 7873 (N); E. Pereira 7400 [Herb. Brad. 26622] (N). Goiás: G. Gardner 3406 (Br); Glaziou 21902 (Br, Cm, N--photo, S); Macedo 3599 (N, S, W--2059743), 3653 (W--2059772). Matto Grosso: Archer & Gehrt s.n. [Capão Bonito, Sept. 5, 1936] (N, Sp--36447, W--1691991); Fabio 35 (Sp--42662, Sp); F. C. Hoehne Com. Rondon 1834 (Sp); A. Lutz 1390 (Lz); Malme 1996 (S), 1996a (S), 1996b (S), 1996c (S, S); Pilger 738 (Vt); J. E. Rombouts s.n. [Pedra, Oct. 11, 1938; Herb. Inst. Agron. Est. S. Paulo 2775] (Sp--41088, Sp); Herbert H. Smith s.n. (Ja--14876); Swallen 9518 (W--1903231). Minas Gerais: Assis 144 (G, N); Brade 13903 [Herb. Rio de Jan. 29538] (B); J. F. de Castro 67 (Sp--31295, Sp); P. Clausen 130 (Du--166589), 384 (Br), 609 (N), 1032 (Br), 1288 (N), s.n. [Aug.--April 1840] (Br, Br, Br); Glaziou 9536 (Bz--21776); Henschen III.1620 [10/10/1868] (W--201219); Heringer 3820 (B), 4008 (B), 5169 (B); F. C. Hoehne s.n. [Pouso Alegre, May 4, 1927] (N, Sp--19389); A. Lutz 939 (Lz); Macedo 482 (S, W--2195929), 1951 (S); Mello Barreto 3274 [Herb. Jard. Bot. Belo Horiz. 371] (N); Mendes Magalhães 1510 (Be--14568), 4319 [Herb. Jard. Bot. Belo Horiz. 45120] (N); Mexia 5871 (Ca--510132, W--1705024); Miers 2483 ["wrong number, 2477?"] (W--1421163); Mulford & Foster 713, in part (W--1779145); Murça Pires & Black 3356 (Be--63800); J. E. Oliveira 1314 [Herb. Jard. Bot. Belo Horiz. 45148] (N); Regnell I.131 [11--16/12/1848] (W--274924), I.331 [Caldas, June 2, 1865] (S), I.331 [Passoe, Caldas, August 14--19, 1865] (S), I.331 [Serra dos Cabretos, Caldas, March 2, 1867] (S, S), I.331d (S), I.531 [2/6/1865] (W--1322932), III.1620 [Caldas, Oct. 10, 1868] (S, S), III.1620 [Ventania, Caldas, Oct. 20, 1868] (N); L. B. Smith 6730 (W--2124666), 6780 (W--2124667), 6921 (W--2120218), 6942 (W--2124673), 7068 (W--2124675); Stephan s.n. [Congonhas do Campo, 1843] (Br); Warming 57 (N); Widgren 348 (S), 1232 (Br), s.n. [1845] (Lu, N), s.n. (S); L. O. Williams 5386 (G); Williams & Assis 5810 (G), 5851 (G, N), 6108 (G), 6211 (G), 6273 (G), 6310 (G, N), 6477 (G, N), 6618 (G, N), 6632 (G), 6927 (G), 7099 (G, N). Pará: Murça Pires, Black, Wurdack, & Silva 6256 (Bm, N). Paraná: Braga 29 [Herb. Mus. Paran. 1504] (Mp); Dombrowski 675 (Ac); Dombrowski, Saito, & Pereira 768/561/155 (Ac), 859/650/289 (Ac); Dusén 2419 (S), 7657 (S), 9062 (S), 10545 (S), 10570 (N, W--1481646), 10570a (S), 10650 (S), 19878 (S), 10915 (S), 13090 (S), s.n. [Villa Velha, March 13, 1904] (S), s.n. [Villa Velha, April 30, 1914] (S), s.n. [Jaguariahyva, Dec. 25, 1914] (S); Hatschbach 2568 (N); Hertel 7 [Herb. Mus. Paran. 1915] (N), 8 [Herb. Mus. Paran. 1962]; F. C. Hoehne s.n. [Ponta Grossa, Nov. 1, 1928] (N, Sp--23249), s.n.

[Jaguariahyva, Nov. 5, 1928] (N, Sp—23408); Jönsson 457a (S); Krieger 1015 (Sp—51456); Reiss 12 (I, I, S); Tessmann s.n. [Herb. Mus. Paran. 2999] (N). Rio de Janeiro: Herb. Rio de Jan. 31714 (N); A. Saint-Hilaire s.n. [Covalinho] (N, N). São Paulo: Brade 5768 (S), s.n. [Itarapina, Sept. 1921] (Sp—6719); Campos Novaes 929 (Sp—2217, W—389895); Dedecca 481 [Herb. Inst. Agron. S. Paulo 17711] (Ca—40289); Edwall s.n. [Bocucatú; Herb. Com. Geogr. & Geol. 1028] (N, Sp—15658); Eiten & Eiten 2273 (N, W—2369862); Eiten & Freitas Campos 3406 (W—2445184); Felippe 79 (W—2404949); A. Gehrt s.n. [Butantan, Nov. 20, 1918] (Sp—3051); G. Gehrt s.n. [Itarapina, Aug. 12, 1919] (Sp—3632); J. F. Gomes s.n. [Miguel Calmon, April 2, 1918] (Sp—1730); A. Hammar 13 (N, Sp—15647); F. C. Hoehne s.n. [Butantan, Capital, Sept. 22, 1917] (N, Sp—577), s.n. [Butantan, Oct. 14, 1918] (N, Sp—2476), s.n. [Butantan, Dec. 23, 1918] (Sp—2659), s.n. [Taubaté, Feb. 24, 1921] (Sp—5321), s.n. [Ipiranga, May 18, 1922] (Sp—7930), s.n. [Mogí-Mirim, May 21, 1927] (N, Sp—20437); W. Hoehne 838 (N, Wh, Wh), 2750 (Wh), s.n. [Campo Congonhas, 10/1941] (Wh); Hoehne & Gehrt s.n. [Campo Largo, Nov. 10, 1936] (N, Sp—36774), s.n. [Capella do Alto, Nov. 10, 1936] (N, Sp—36780), s.n. [Tatuhy, Dec. 1, 1936] (N, Sp—37031); Löfgren 98 (S), 154 (Cp, N, N—photo, Z—photo), s.n. [Itapetininga, Sept. 19, 1887; Herb. Com. Geogr. & Geol. 154] (N, Sp—15655), s.n. [Araraquara, Nov. 20, 1888; Herb. Com. Geogr. & Geol. 1028] (Sp—15644); Luederwaldt s.n. [Ipiranga, Nov. 1907; Herb. Mus. Paulista 82] (N, Sp—15653); Machado de Campos 72 (W—2369483); Martius 1034 (M); Mimura 14 (W—2445185); Moldenke & Moldenke 19668 (N); Mosén 1529 (S), 3909 (N, S, Sp—6715); Navarro de Andrade s.n. [Araras, Nov. 29, 1929] (Sp—24518); Pickel 2724 (N, Sf); Rachid s.n. [Emas, Dec. 3, 1944] (Sp—53617); Riedel & Lund 1450 (N); A. Russel 18 (N, Sp—20078); Santoro, Krug, Costa, & Zagatto s.n. [Fazenda Campo Grande, Campinas, Dec. 18, 1938; Herb. Inst. Agron. Est. S. Paulo 3289] (Be—35654); Usteri s.n. [Avenida Paulista, Capital, Nov. 18, 1906] (Sp—15664); A. P. Viégas s.n. [Cascavel, Sept. 27, 1939; Herb. Inst. Agron. Est. S. Paulo 5076] (Sp—44301, Sp), s.n. [Cascavel, Sept. 27, 1939; Herb. Inst. Agron. Est. S. Paulo 5078] (Sp—44302, Sp); Viégas & Zagatto s.n. [Campinas, Dec. 4, 1938; Herb. Inst. Agron. Est. S. Paulo 3128] (Sp—41087, Sp, W—1459557), s.n. [Mogí-Mirim, June 2, 1939; Herb. Inst. Agron. Est. S. Paulo 4600] (Sp—44307, Sp), s.n. [Mogí-Mirim, June 2, 1939; Herb. Inst. Agron. Est. S. Paulo 5110] (Sp—44304, Sp). State undetermined: P. Clausen s.n. (Z—photo); Collector undesignated 235 [Herb. Inst. Bot. S. Paulo 20074] (N), 236 (Sp—20074), s.n. (Sp—15650); Dupré s.n. [Brésil méridional, 1842] (B, N); Raben 514 (Br, Br), 766 (Br, Br), 819 (Br), 875 (Br); Sel-

low 2331 [Brasilia; Macbride photos 17523] (Br--isotype, Kr--photo of type, N--photo of type, Vt--isotype, W--photo of type). BOLIVIA: Santa Cruz: Bourke-Borrowes 86 (K); M. Cárdenas 5638 (W--2429777); Kuntze s.n. [Ost-Velasco, VII.92] (N); d'Orbigny 897 (Br). PARAGUAY: Anisits 2610 (S); Fiebrig 6352 (W--1159380); Hassler 1859 (N, N), 7261 (Ca--944314, N, S); Jürgensen 4585 (Du--290311, S, W--1573102). ARGENTINA: Misiones: Ekman 2016 (Mi, S); Quiroga 329 [Herb. Osten 6985] (Ug), s.n. [San Ignacio, August 28, 1913; Herb. Mus. Argent. Cienc. Nat. 23852] (N, Ra--23851); A. G. Schulz 7105 (N, Z).

LIPPIA LUPULINA var. ALBIFLORA Troncoso, Darwiniana 12: 258 & 289--291. 1961.

Synonymy: Lippia paraguariensis Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1163--1164. 1904.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1163--1164. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 499. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96. 1942; Moldenke, Lilloa 8: 425 (1942) and 10: 378--379. 1944; Moldenke, Alph. List Cit. 1: 264 (1946) and 3: 693. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99 & 190. 1949; Moldenke, Résumé 117 & 462. 1959; Troncoso, Darwiniana 12: 258 & 289--291, pl. 4, fig. 17. 1961; Moldenke, Résumé Suppl. 5: 5--7. 1962.

Illustrations: Troncoso, Darwiniana 12: 290, fig. 17, & pl. 4. 1961.

This variety differs from the typical form of the species in having white corollas.

The type of the variety was collected by Emil Hassler (no. 7802) in fields in the region of the upper course of the Río Apa, Paraguay, in November, 1902, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where it was photographed by Macbride as his type photograph number 24656. It is very possible that the Archer & Gehrt s.n. [Campo Bonito, Set. 5, 1936], from Matto Grosso, Brazil, cited above under typical L. lupulina Cham., may be this variety, since it is described as having had white flowers. Pickel 2724, from São Paulo, is described as having had corollas with "white limb and yellow throat", while Mendes Magalhães 4319 and Williams & Assis 6310, 6477, & 7099 are said to have had "yellow" flowers. Whether these belong here, too, is not at all clear until the exact color of the corollas [as distinct from the bracts] in the typical form is established.

In all, 1 herbarium specimen and 4 mounted photographs of the type collection have been examined by me.

Citations: PARAGUAY: Hassler 7802 [Macbride photos 24656] (It--photo of type, Kr--photo of type, N--isotype, N--photo of isotype, W--photo of type).

LIPPIA LUPULINA var. PARAGUARIENSIS Chod., Bull. Herb. Boiss., sér. 2, 2: 820. 1902.

Synonymy: Lippia renifolia Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863.

Bibliography: Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Chod., Bull. Herb. Boiss., sér. 2, 2: 820. 1902; Chod., Pl. Hassler. 1 (9): 199. 1902; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Cit. 1: 223 (1946) and 3: 693. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Phytologia 3: 289. 1950; Moldenke, Résumé 94, 116, & 462. 1959; Troncoso, Darwiniana 12: 258. 1961; Moldenke, Résumé Suppl. 11: 4. 1964.

This variety differs from the typical form of the species in having its leaves smaller and more deeply cordate at the base.

The variety was based by Chodat on three collections made by Emil Hassler in Paraguay -- nos. 4335, 4557, and 5098. Lippia renifolia was based on George Gardner 4336, collected in 1841 in the state of Goiás, Brazil -- an isotype in the Geneva herbarium was photographed by Macbride as his type photograph number 24663.

Material of this taxon has been misidentified and distributed in herbaria under the name L. lupulina Cham. & Schlecht.

In all, 5 herbarium specimens and 5 mounted photographs, including type or phototype material of both names involved, have been examined by me.

Citations: BRAZIL: Brasilia: Cobra & Oliveira 256 (Z). Goiás: G. Gardner 4336 [Macbride photos 24663] (It--photo, Kr--photo, M, N, N--photo, W--photo, Z--photo). PARAGUAY: Hassler 4557 (N--cotype), 5098 (N--cotype).

LIPPIA MACEDOI Moldenke, Phytologia 6: 327--328. 1958.

Bibliography: Moldenke, Phytologia 6: 327--328. 1958; Moldenke, Biol. Abstr. 33: 1215. 1959; Moldenke, Résumé 93 & 462. 1959; Hocking, Excerpt. Bot. A.5: 44. 1962.

Subshrub; stems and branches slender, obtusely tetragonal and sulcate or sometimes more acutely angled, densely canescent-strigose, the hairs becoming brownish in age; nodes annulate; principal internodes 1.2--6.5 cm. long; leaves decussate-opposite, very short-petiolate or subsessile; petioles when present rather stoutish, to 2 mm. long, densely canescent-strigose; leaf-blades firm-textured or even subcoriaceous, grayish-green on both surfaces but lighter beneath, elliptic, 2.7--5 cm. long, 1--2 cm. wide, acute at the apex, regularly serrate with rather appressed teeth from the apex to well below the middle, rounded or acutish at the base, bullate and densely strigose with bulbous-based hairs above, the hairs antrorsely confluent on each elevated portion between the deeply sunken veins, also densely strigose beneath with canescent hairs; midrib and the 5 pairs of slender secondaries deeply impressed above and very sharply prominent beneath, the secondaries ascending and slightly arcuate; tertiaries very numerous, slender, rather straight and subparallel, issuing

at almost right angles to the secondaries, impressed above and very slightly prominulous beneath; inflorescence axillary, capitate or subspicate, solitary in each of the upper axils; peduncles slender, rather sharply tetragonal, densely white-strigose with antrorse hairs, 1.5--3.5 cm. long, ascending, stiff; heads ovoid, 6--15 mm. long, 9--11 mm. wide; bracts ovate, the lowest ones to 6 mm. long and 3 mm. wide, acuminate at the apex, rather densely canescent-strigose with antrorse hairs, the peripheral ones long, stiffer, and bulbous-based; corolla rose, about 6 mm. long, the tube densely short-pubescent on the outside, the limb about 2.5 mm. wide.

The type of this distinctive species was collected by Amaro Macedo (no. 4423) -- in whose honor it was named -- in a field at Jacubá, in the municipality of Niquelandia, Goiás, Brazil, on February 24, 1956, and is deposited in the United States National Herbarium at Washington. The species is known thus far only from the type collection. In all, 2 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Goiás: Macedo 4423 (W--2249264--type, Z--isotype).

LIPPIA MARRUBIIFOLIA Reichardt, Verh. Zool.-bot. Ges. Wien 33: 322--323. 1884.

Bibliography: Reichardt, Verh. Zool.-bot. Ges. Wien 33: 322--323. 1884; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95 (1942) and [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93 & 462. 1959.

Small shrub, 5--6 dm. tall, pilose-hirsute throughout as well as glandular-pubescent, dew-branched above; branches terete, elongate, procumbent at the base, later assurgent, leafy toward the apex; principal internodes 3--6 cm. long; leaves decussate-opposite, very short-petiolate; leaf-blades rounded or subrotund, 2--4 cm. long, cordate at the base, obtuse at the apex, coarsely dentate-serrate along the margins, rugose-venose, more or less densely pilose-hirsute on both surfaces, the venation pinnate, impressed above, prominent beneath; inflorescence corymbose; peduncles rigid, erect-spreading, 3--6 cm. long, terete; heads 2--2.5 cm. wide; bractlets ovate-rounded, 8--12 mm. long, acuminate at the apex, ciliate along the margins, reticulate-venose, pubescent, petaloid, handsomely rose, 5--7-veined; calyx 2 mm. long, bilobed, densely villous and glandular; corolla pubescent outside, the tube slender, slightly incurved, 8--10 mm. long, subequaling the subtending bractlet, the limb rather large, 5 mm. wide, rose, puberulent, more obscurely veined, the throat yellowish, the upper lobes obovate, emarginate, the lateral lobes ovate, obtuse at the apex, the lowest lobe subquadrate; stamens inserted at the middle of the corolla-tube, didynamous; filaments short; style shortly exserted from the calyx; stigma obliquely capitate, emarginate-bilobed; ovary glabrous; fruit not known.

The type of this apparently rare species was collected by Adol-

phus Varnhagen in dry places at the village of Porto Seguro, in the neighborhood of Piricatu, Minas Gerais, Brazil. The author places the species in the Section Rhodocnemis and says "Die Lippia marrubiifolia ist mit L. hederaefolia Mart. et Schauer.....am nächsten verwandt, unterscheidet sich von derselben aber durch die am Grunde niederliegenden, dann aufsteigenden stielrunden, dicht behaarten und drüsigen Aeste, durch die viel grösseren, rundlichen Blätter mit herzförmigem Grunde und stark runzeliger Blattspreite, ferner durch die eiförmigen, zugespitzten Bracteen, endlich durch die nicht nur behaarten, sondern auch zugleich drüsigen Kelche so auffallend dass an eine Verwechselung nicht zu denken ist."

Hayek (1906) says that his L. reticulata differs from this in having its leaves not velutinous above, dentate instead of crenate along the margins, the heads smaller, and the bractlets hirsute.

Nothing is known to me of L. marrubiifolia except what is given in the literature. The type is probably deposited in the herbarium of the Naturhistorisches Museum in Vienna, since it was apparently seen by Hayek.

LIPPIA MARTIANA Schau. in A. DC., Prodr. 11: 578. 1847.

Synonymy: Lippia martiana Cham. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia myriantha Mart. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia pyramidalis Hiern ex Moldenke, Alph. List Invalid Names Suppl. 1: 15, in syn. 1947.

Bibliography: Schau. in A. DC., Prodr. 11: 578. 1847; Schau. in Mart., Fl. Bras. 9: 229. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 95. 1942; Moldenke, Alph. List Cit. 1: 90 & 106. 1946; Moldenke, Alph. List Invalid Names 14 & 15. 1947; H. N. & A. L. Moldenke, Fl. Life 2: 71. 1948; Moldenke, Alph. List Cit. 2: 366, 413, & 486 (1948), 3: 710, 751, 845, & 916 (1949), and 4: 1105, 1106, 1124, 1203, 1204, & 1300. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93, 314--316, & 462. 1959; Moldenke, Phytologia 12: 23, 47, & 170. 1965.

Shrub, 1—2 m. tall; stems fruticose, erect, paniculately branched above, obsoletely tetragonal, splendidly silky-hirsute throughout; leaves ternate, short-petiolate, spreading or reflexed; leaf-blades ovate or ovate-elliptic, the lowest 5 cm. long and about 2.5 cm. wide, the upper ones gradually smaller, the uppermost very small and subrotund, all short-acuminate at the apex, cordate at the base, crenate along the margins, penninerved, rugose, scabrous-tomentose and hirtous above, villous-tomentose and incanous beneath, the floral ones diminutive; floriferous branchlets spreading, "foliorum pari sterili stipati apice thyrsum, paniculam constituentes"; peduncles usually in 4's, about 4 mm. long, equaling the subtending leaves, the verticels congested at the apex of the branchlets; heads small, subglobose-tetraquetrous, to 3 mm.

long; bractlets herbaceous, ovate, imbricate, acute at the apex, sericeous-villous, pulverulent-glandulose beneath the indumentum, half as long as the corolla-tube, the basal ones connate; calyx ovate, bifid, 4-dentate, sericeous-strigose; corolla rubescent or white, pulverulent-glandulose on the outside, the tube 2 mm. long, straight, ventricose at the middle, the limb 2 mm. wide, the lobes reflexed, truncate at both ends.

This species was based by Schauer on a specimen collected by Peter Clausen (no. 140) in fields Caxoeira do Campo, Minas Gerais, Brazil, on May 2, 1839, and one collected by Anders Fredrik Regnell (no. I.333) also in the state of Minas Gerais, deposited in the Martius, DeCandolle, and Sonder herbaria. The first of these specimens is referred to by Schauer as Clausen 1028, but "1028" seems to be the Herb. Martius number as is indicated on the label of Macbride's type photograph number 7859 of a specimen in the Delessert Herbarium at Geneva. It is also referred to as Clausen s.n. and is also the type collection of L. myriantha.

The type of L. pyramidalis was collected by Johannes Eugenius Bulow Warming (no. 15) at Lagoa Santa, Minas Gerais, Brazil, on June 8, 1864, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The Regnell I.333 collections cited below are obviously not cotypes of L. martiana since they were collected 10 and 20 years after the species was named.

The species is placed by Schauer (1847) in his Section Goniostachyum. It has been found growing only in fields and on campos, flowering from January to March and June. Although Schauer states that the flowers are rubescent, they are described as "white" on Mosén 4318 and E. Pereira 7388. The Mosén 1526 distributed as L. martiana is actually L. salviaefolia Cham., while Regnell III.942 is L. sidoides Cham., Dusén s.n. [Morungava, 1914-16] is L. obscura Briq., and Mosén 4318 & J. E. Pohl s.n. [Brasiliae] are L. pohliana Schau.

In all, 33 herbarium specimens, including type material of all the names involved, and 7 mounted photographs have been examined by me.

Citations: BRAZIL: Brasilia: E. Pereira 7388 [Herb. Brad. 26624] (N); E. Santos 1649 [Sacco 1882; Herb. Brad. 27094] (N). Minas Gerais: Campos Novaes 124 (N, Sp--15691); P. Clausen 12 (P), 140 [Herb. Martius 1028; Macbride photos 7859] (Br--cotype, Br--cotype, F--photo of cotype, Kr--photo of cotype, M--cotype, N--photo of cotype, N--photo of cotype, Si--photo of cotype, W--photo of cotype, Z--photo of cotype), 612 (Cp, N, N, S), 614 (S), s.n. [1840] (Br); Mosén 4318 (N, S); Regnell I.333 [3/2/1857] (S), I.333 [11/5/1867] (N, S, S, S, W--209651), I.333c (S); Schwacke s.n. (Ja--32326); Warming 15 (S), s.n. [Lagoa Santa] (N); Widgren 1235 (Br), s.n. [Caldas, Feb. 17, 1846] (Br, S, W--1322937), s.n. [1845] (Lu, Lu), s.n. [Brasiliae] (S).

LIPPIA MATTOGROSSENSIS Moldenke, Phytologia 1: 468. 1940.

Bibliography: Moldenke, Phytologia 1: 468 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Cit. 1: 289. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Cit. 2: 369, 552, 553, & 621. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 348. 1951; Moldenke in E. Y. Dawson, Los Angeles Co. Mus. Contrib. Sci. 7: 11 & 12, fig. 3L. 1957; Moldenke, Résumé 93 & 462. 1959; Moldenke, Phytologia 12: 170. 1965.

Illustrations: Moldenke in E. Y. Dawson, Los Angeles Co. Mus. Contrib. Sci. 7: 12, fig. 3L. 1957.

Herb; branchlets slender, obtusely tetragonal, brown, densely hirsute with long white hairs, rather twiggy, the hairs 1--1.3 mm. long; principal internodes 3--4.5 cm. long; leaves decussate-opposite; petioles slender, 4--10 mm. long, densely hirsute like the branchlets; leaf-blades thin-chartaceous, dark-green, lighter beneath, elliptic-ovate or ovate, 2--5.5 cm. long, 1.2--2.6 cm. wide, acute at the apex, serrate along the margins from the base to the apex with small blunt teeth (6--9 per cm. of margin), acute or rounded at the base, hirsute above with hairs precisely like those on the branchlets, twigs, and petioles, densely hirsute-tomentose beneath with somewhat shorter, tangled, whitish or cinereous hairs and also densely granular-pulverulent and resinous; midrib slender, flat or obscurely impressed or subimpressed above, prominulent beneath; secondaries slender, 6--10 per side, usually irregular, arcuate-ascending, slightly subimpressed above, prominulent beneath; vein and veinlet reticulation abundant, rather obscurely subprominulent above, prominulent and dark beneath; inflorescence axillary, capitate, numerous, 4--6 in each upper leaf-axil (rarely reduced to 1 per axil in the lowermost axils of the twigs); peduncles very slender, 5--16 mm. long, densely long-hirsute like the twigs; heads dense, 4--10 mm. long, 7--9 mm. wide.

The type of this species was collected by Frederico Carlos Hoehne (Com. Rondon 4541 & 4542) at Coxipó da Ponte, Cuiabá, Matto Grosso, Brazil, in March, 1911, and is deposited in the herbarium of the Instituto Botanico at São Paulo. In my original description of this species the type number was given as "470", but this number, according to Dr. Hoehne in a letter to me dated December 13, 1948, was only a reference number at the side of the label. He himself cites it as "No. 4541 - F. C. H., Coxipó da Ponte, Cuiabá, Mato Grosso, 3-1911 (Não 470, conforme por engano saiu no trabalho referido para a descrição original). No SP duplicata no. 4542 = 31975."

The plant has been found in cerrados and on the banks and margins of small streams running through hilly cerrado, flowering in March and May. In all, 6 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Goiás: E. Y. Dawson 14864 (Z). Matto Grosso: F. C. Hoehne Com. Rondon 4541 [470; 4542] (N--photo of type, N--isotype, N--isotype, Sp--31975--type, Z--photo of type); Krug 25

(N--photo, Sp--39443, Sp, Z--photo).

LIPPIA MCVAUGHI Moldenke, Résumé Suppl. 4: 4, nom. nud., June 5. 1962; Phytologia 8: 388, December 10. 1962.

Bibliography: Moldenke, Résumé Suppl. 4: 4. 1962; Moldenke, Phytologia 8: 388. 1962; Moldenke, Biol. Abstr. 42: 1517. 1963; Hocking, Excerpt. Bot. A.6: 455. 1963.

Tree, 10--12 m. tall; trunk 25 cm. in diameter at breast height; branchlets slender, gray-stramineous, glabrous, the younger parts obscurely tetragonal; leaves decussate-opposite, numerous toward the tips of the branchlets; petioles very slender, about 1 cm. long, glabrous; leaf-blades thin-chartaceous, shiny-green on both surfaces, elliptic or ovate, 2--6 cm. long, 1--3.5 cm. wide, acute or short-acuminate at the apex, sharply serrate with regular somewhat antrorsely appressed teeth from below the widest part to the apex, cuneate-acuminate at the base, glabrous on both surfaces; midrib very slender, flat above, prominent beneath; secondaries very slender, 5--8 per side, arcuate-ascending, not anastomosing, terminating in the simuses between the teeth, flat above, prominulous beneath; veinlet reticulation rather sparse and not prominent; inflorescence axillary, near and at the apex of the branchlets, one per axil, opposite and decussate; peduncles filiform, 1.5--4 cm. long, glabrous; heads densely many-flowered, 1.4--2.5 cm. wide; bracts large, ovate, papery, greenish-white, 12--15 mm. long, 6--8 mm. wide at the base, acute at the apex, sessile, densely short-pubescent on both surfaces; corolla white, yellow in the center.

The type of this species was collected by Rogers McVaugh — in whose honor it was named — and Walter Norman Koelz (no. 1660) on low mountain summits 7 miles north of Santiago, on the road to Durazno, in deciduous woodlands, growing with Cordia, Brosimum, and Platymiscium, at an elevation of 200 meters, Colima, Mexico, on December 10, 1959, and is deposited in the herbarium of the University of Michigan at Ann Arbor. The collectors note that the plant was abundant at the type locality. It is known thus far only from the original collection. In all, 2 herbarium specimens, including the type, have been examined by me.

Citations: MEXICO: Colima: McVaugh & Koelz 1660 (Mi—type, Z—isotype).

LIPPIA MEGAPOTAMICA Spreng., Syst. Veg., cur. Post, 4 (2): 231 & 351. 1827.

Bibliography: Spreng., Syst. Veg., cur. Post, 4 (2): 231 & 351. 1827; Steud., Nom. Bot., ed. 2, 2: 54. 1840; Schau. in A. DC., Prodr. 11: 593. 1847; Schau. in Mart., Fl. Bras. 9: 252. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 94 (1942) and [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93 & 462. 1959.

Nothing is known to me about this species except what is stated in the original description, namely, that it is a perennial plant, with terminal hemispheric heads, broadly ovate en-

tire bracts, leaves that are ovate, serrate, pilosulous on the veins beneath, and an erect herbaceous stem. The type was collected by Friedrich Sellow in Rio Grande do Sul, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, but is now destroyed.

LIPPIA MEIASTOMIFOLIA Gandoger, Bull. Soc. Bot. France 65: 63—64. 1918.

Bibliography: Gandoger, Bull. Soc. Bot. France 65: 63—64. 1918; A. W. Hill, Ind. Kew. Suppl. 6: 117. 1926; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 20 & 96 (1942) and [ed. 2], 35 & 190. 1949; Moldenke, Résumé 42 & 462. 1959.

Branches glabrous, broadly quadrangular, sulcate; leaf-blades oblong-lanceolate, 5—6 cm. wide, more contracted at the base than in L. myriocephala Schlecht. & Cham., entire along the margins, glabrous above, lightly hirtellous beneath; inflorescence glabrous; peduncles angulate, glabrous, shorter than in L. myriocephala; floral bractlets cuspidate-lanceolate.

The type of this puzzling species was collected by Hans von Türckheim in Alta Verapaz, Guatemala. Gandoger compares it with L. myriocephala, saying "A planta typica mexicana (Ehrenberg n. 1202!) L. myriocephalae Cham. Schlecht. valde differt", followed by the characters given above. He also says "An hujus sectionis ob ramos valde angulosos? specimina mexicana tomentella sunt foliis minoribus villosis obsolete crenulatis, verticillastris multifloris longe pedunculatis."

Nothing whatever is known to me about this plant except what is stated in the original description. The description does not seem to apply to any other species of the genus known to me thus far from Alta Verapaz.

LIPPIA MICROCEPHALA Cham., Linnaea 7: 220--221. 1832.

Synonymy: Lippia hermannioides Cham., Linnaea 7: 219--220. 1832. Lippia triplinervis Gardn. in Hook., Lond. Journ. Bot. 4: 133--134. 1845. Lippia viscosa Casar. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941. Lippia hermannioides Cham. & Schlecht. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947.

Bibliography: Cham., Linnaea 7: 219--221. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 597. 1843; G. Gardn. in Hook., Lond. Journ. Bot. 4: 133--134. 1845; Walp., Repert. Bot. Syst. 4: 45 & 46. 1845; Schau. in A. DC., Prodr. 11: 587—588. 1847; Schau. in Mart., Fl. Bras. 9: 240--241 & 307, pl. 38, fig. 2. 1851; Bocq., Adansonia 3: 244. 1863; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 99. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95 & 96. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541--542. 1911; Stapf, Ind. Lond. 4: 125. 1930; Moldenke, Suppl. List Invalid Names 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 95, & 96. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Am. Journ. Bot. 32: 611. 1945;

Moldenke, Alph. List Cit. 1: 94, 107, & 238. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 14. 1947; Moldenke, Phytologia 2: 336. 1947; Moldenke, Alph. List Cit. 2: 484 (1948), 3: 689, 693, 710, 711, 725, 730, 916, & 920—923 (1949), and 4: 1072, 1132, 1134, 1203, 1204, 1261, & 1300. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 93, 313, 318, & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 8: 5. 1964; Moldenke, Phytologia 12: 24 & 222. 1965.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 38, fig. 2. 1851.

Many-stemmed subshrub or shrub, 1—2 m. tall, erect, much-branched, scabrid-hirtous or glandulose-subhirsute, glandular-punctate beneath the indumentum, often stout and with the appearance of Hermannia disticha Schrad. or H. micrantha Schrad. and viscid with short and dense glandular indumentum throughout; branches tetragonal or subtetragonal, spreading, twiggy; branchlets dense, strict, fuscous; leaves approximate, distinctly short- or very short-petiolate, glandulose, aromatic with an odor almost like that of Hyssopus; leaf-blades green above, elliptic or obovate to cuneate-obovate or subrotund, about 1.2 cm. long, 0.6—1 cm. wide, larger on sterile shoots, truncate or retuse at the apex, acutely dentate or crenate toward the apex with 3 or 4 teeth on each side (the apical one broad and acute or truncate), revolute along the margins, entire and cuneate at the base and attenuate into the petiole, impressed-pennineryed and rugose above, scabrous and shiny above, softly canescent-hirtellous and densely glandular-pulverulent or glandular-punctate beneath or strigose-hirtellous only on the reticulation, at first incanous, often finally ferruginous, usually hirtellous on the venation, sometimes also on the lamina; inflorescence pedunculate, loosely nodding or lax, spicate, equaling or shortly surpassing the subtending leaves; peduncles long or short, erect during anthesis, nodding after anthesis; heads subspicate, few- (3—5) flowered, oblong, lax, almost hidden by the foliage; bractlets membranous, lanceolate or elliptic, about 6 mm. long, acute or subobtuse at the apex, 5-veined, reticulate, patulous, hirsutulous, inflexed, loosely imbricate, subequaling the corolla-tube, ciliate, the outer ones involucrate; flowers aromatic, very shortly pedicellate; calyx campanulate, membranous, 2—3 mm. long, often very short, 4-veined, loosely investing the base of the corolla-tube or almost half as long as the corolla-tube, subvillous or subhirtellous, bidentate or irregularly 4-dentate, the teeth broad, acute, ciliate; corolla hypocrateriform, white to lilac, lilac-pink, violet, rose, or clear-rose, yellow in the throat, villosulous on the outside or pubescent only above, its tube rather straight, ampliate at the middle, the limb rather large, slightly surpassing the bractlets, white or yellowish to pinkish, the lobes rounded, the middle lobe of the lower lip erect, concave, truncate, undulate or crisped on the margins; mature fruit

included by the fruiting-calyx, the carpels coherent, one often aborted.

The type of this species was collected by Friedrich Sellow at the summit of the mountain called Morro de Villa Rica, at 4500 feet altitude, in Minas Gerais, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17525, but is now destroyed. The type of L. hermannioides was collected by Sellow at Serra de Cocheira in the same state, deposited in the same herbarium, photographed by Macbride as his type photograph number 17513, and also now destroyed. The type of L. viscosa was collected by Giovanno Casaretto (no. 2922) at Serra da Caraca, also in Minas Gerais, and deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques in Geneva, where it was photographed by Macbride as his type photograph number 24678. The type of L. triplinervis was collected by George Gardner on the summit of the Organ Mountains, Rio de Janeiro, Brazil.

Schauer (1851) says of L. microcephala: "L. Hermannoidi valde similis sed habitu strictiori, foliis minoribus acute dentatis indumento parciori et rigidiori vestitis; capitulis minoribus magisque compactis, bractearum figura, corollae minore et potissimum calyce grandi diversa." Hiern (1877) maintains L. triplinervis and L. hermannioides as valid species and reduces L. microcephala to synonymy under the latter. Walpers (1845), Steudel (1840), and Schauer (1847) keep L. microcephala and L. hermannioides as separate species. Meisner notes on Martius 1038 "L. hermannioides Cham. & Schl. ex Mart., non Schau." Schauer (1847) says that the species is related to L. iodophylla Schau. and classifies it in his Section Zapania, Subsection Axilliflorae.

In regard to flower color it is of interest to note that the corolla is described as "lilac" on Brade 13906; "white & lilac" on Pereira 7524; "lilac-pink fading to white" on Mexia 5710; "violet" on Mendes Magalhães 4332; "clear-rose" on Mendes Magalhães 4333; "rose" on Badini s.n.; and "white" on Glaziou 15330, Macedo 2061, L. O. Williams 5076, and Williams & Assis 6711.

The species has been found on campos and high campos, in calcareous sandy soil of campos, and in brushy pastures, at altitudes of 1270--2100 meters, flowering from February to April and in June. Mexia says of it "common locally", while Schauer says "Crescit copiose in montosis apricis virgultosis prov. Minarum generalium", "in montibus ferruginosis", and "in campis siccis". The vernacular name, "alecrín", has been recorded for it. Material has been misidentified and distributed in herbaria under the names L. grandiflora Mart. & Schau., L. pseudo-thea Schau., and Hyptis sp. On the other hand, the Löfgren s.n. [Herb. Inst. Bot. S. Paulo 15660], distributed as L. microcephala, is actually a species of Hyptis in the Lamiaceae.

Schauer (1851) cites, in addition, under L. microcephala a Lund

s.n., Riedel s.n., and Schüch s.n. [Morro de Villa Rica] from Minas Gerais and Vauthier 194 from Rio de Janeiro, and for L. hermannioides a Martius s.n. [in alpinis ad Villa Rica], Riedel s.n. [in saxosis montis in Serro do Caraca], and Sellow s.n. [Serra de Cacheira]. Glaziou (1911) cites his nos. 19706 & 19707 from Minas Gerais -- possibly the "19709" cited below is an error in transcription for 19707.

In all, 51 herbarium specimens and 15 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: BRAZIL: Goiás: Glaziou 21898 (Br, Cm, S). Minas Gerais: Badini s.n. [Morro do Cruzeiro, 21-VI-942] (Be--13651); Barreto & Brade 14469 [Herb. Rio de Jan. 29523] (B); Brade 13459 [Herb. Rio de Jan. 29534] (B), 13906 [Herb. Rio de Jan. 29533] (B); Casaretto 2922 [Macbride photos 24678] (Kr--photo, N--photo, W--photo); P. Clausen 6 (P), 127 (Br, Br, Br), 381 (Br, N), 381b (Br), 1058 (Br), s.n. [Aug.-April 1840] (Br), s.n. [1840] (S), s.n. [Brésil] (N, W--1706076, W--2343283); Eschwege s.n. [Villa Rica, 1824] (Br); Glaziou 15330 (W--1112497), 19709 (Br); Herb. Rio de Janeiro prov. no. I (Ja); Macedo 2061 (N, S); Martius 1038 (M), s.n. [Minas, 1821] (Br); Mello Barreto 3214 [Herb. Jard. Bot. Belo Horiz. 11163] (N), 5059 (N); Mendes Magalhães 4332 [Herb. Jard. Bot. Belo Horiz. 45160] (N), 4333 [Herb. Jard. Bot. Belo Horiz. 45162] (N); Mexia 5710 (Gg--286575, Go, N, N, S); E. Pereira 7524 [Herb. Brad. 26623] (N); J. E. Pohl s.n. [Brasil, 1819] (Br, N--photo); A. Saint-Hilaire s.n. [Serra da Caraca] (N, N); Schwacke s.n. (Ja--14890); Segadas-Vianna 6011 (Ja); Sellow 889 (Vt), 1279 (Vt), s.n. [Brasilia; "L. hermannioides"; Macbride photos 17513] (F--photo, Kr--photo, N--photo, N--photo, Si--photo, W--photo, Z--photo), s.n. [Brasilia; "L. microcephala"; Macbride photos 17525] (Kr--photo of type, N--photo of type, N--photo of type, Vt--isotype, W--photo of type); L. O. Williams 5076 (G, N); Williams & Assis 6711 (G, N), 6717 (G). MOUNTED ILLUSTRATIONS: Mart. Fl. Bras. 9: pl. 38 (Br).

LIPPIA MICROMERA Schau. in A. DC., Prodr. 11: 587. 1847.

Synonymy: Lippia origanifolia Kunth ex Cham., Linnaea 7: 226, nom. nud. 1832. Gardoquia origanoides Reichenb. ex Cham., Linnaea 7: 226, in syn. 1832. Lippia micromer Schau. ex Moldenke, Suppl. List Invalid Names 6, in syn. 1941. Lippia micromeria Schau. ex Moldenke, Résumé 314, in syn. 1959.

Bibliography: Cham., Linnaea 7: 226. 1832; Schau. in A. DC., Prodr. 11: 587. 1847; Griseb., Fl. Brit. W. Ind. 495. 1861; Griseb., Cat. Pl. Cub. 215. 1866; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Urb., Symb. Ant. 4: 532 (1911) and 8: 594. 1921; Britton & P.

Wils., Scient. Surv. Porto Rico 6: 142. 1925; Moldenke, Alph. List Common Names 28. 1930; Moldenke, Revist. Sudam. Bot. 5: 2. 1939; Moldenke, Lilloa 4: 293—294. 1939; Moldenke, Suppl. List Invalid Names 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 29, 30, 32, 33, 73, & 96. 1942; Moldenke, Alph. List Invalid Names 31. 1942; Moldenke, Phytologia 2: 81 & 107. 1945; Moldenke, Alph. List Cit. 1: 12, 22, 30, 67, 156, & 179. 1946; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 45. 1947; Moldenke, Phytologia 2: 347. 1947; Neal, In Gard. Hawaii 637 & 638, fig. 244b. 1948; Moldenke, Alph. List Cit. 2: 352, 543, & 610 (1948), 3: 749, 764, 820, 935, & 974 (1949), and 4: 984, 1008, 1077, 1096, 1172, & 1219. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Phytologia 3: 74 & 133. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 56, 57, 60, 63, 66, 162, & 190. 1949; Moldenke, Revist. Sudam. Bot. 8: 173. 1950; Calpouzos, Econom. Bot. 8: 228. 1954; Moldenke, Fl. Trin. & Tob. 2 (6): 390—391. 1955; Moldenke, Fam. 2 Verbenac. 9—10. 1955; Moldenke, Résumé 62, 63, 67, & 462. 1959; Moldenke, Résumé Suppl. 6: 5 (1963) and 10: 2. 1964; Moldenke, Phytologia 12: 24, 47, 162, 164, & 190. 1965.

Illustrations: Neal, In Gard. Hawaii fig. 244b. 1948.

Small bush or small leafy shrub, to 2.5 m. tall, usually much lower, much-branched, often gregarious, the whole plant with a strong odor of mint or thyme, glandular-punctate throughout beneath the pubescence; branches tetragonal, villosulous; twigs axillary, very leafy; leaves decussate-opposite, those on the twigs crowded so as to appear fasciculate, aromatic-fragrant; petioles very short; leaf-blades small, 6—12 mm. long, 3—6 mm. wide, obovate-elliptic, subacute at the apex, narrowed into the petiole at the base, usually entire or sparsely crenate with only a few obscure teeth near the apex, sometimes distinctly toothed, revolute along the margins, strigose-pubescent above, villous or hirtellous-pubescent and subcanescent beneath, the midrib and secondaries mostly impressed above; inflorescence capitate, hemispheric, solitary in the upper axils of the twigs, very shortly pedunculate, equaling or shorter than the subtending leaves; bractlets loosely imbricate, membranous, elliptic, 3—5-veined, pellucid, obtuse at the apex, pubescent, ciliate along the margins, shorter than the corolla-tube, the exterior ones slightly larger than the inner ones; flowers fragrant; calyx about 2 mm. long, bifid, long-villous; corolla hypocrateriform, white, yellowish in the throat, its tube subglabrous, punctate, about twice as long as the calyx.

This species was based by Schauer on a collection made by Johan Wilhelm Karl Moritz (no. 492) along the Río San Rafael near Angostura, Angostura, Venezuela, deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17526, now destroyed; on Sieber Fl. Trinit. 86, presumably from Trinidad; on a collection by José Antonio de la Ossa from Cuba; and on one by Carlo Giuseppe Bertero from Puerto Rico, deposited in the Berlin and DeCandolle

herbaria. The Cuban and Puerto Rican collections probably represent var. helleri (Britton) Moldenke. The Moritz collection is hereby designated as logotype of L. micromera in its typical form.

Schauer (1847) placed the species in his Section Zapania, Subsection Axilliflorae.

The type of Gardoquia origanoides is Sieber Fl. Trinit. 86, presumably (but not definitely) collected on the island of Trinidad, and deposited in the Reichenbach Herbarium at the Naturhistorisches Museum in Vienna.

This typical form of L. micromera is known only in the wild state from northern South America, perhaps including the islands of Trinidad and Margarita, but there are named varieties in the Greater Antilles and in Brazil. Dr. Cheesman says in a letter to me regarding the occurrence of L. micromera in Trinidad: "I doubt if this is native. Trin. Herb. 4586 is Baptiste, Maraval, and in my experience that combination of collector and locality occurs on a number of plants that are not native. The Botanic Gardens are on the Maraval side of Port of Spain, and I believe the locality indicated is either the R. B. G. or a private garden. The Sieber record by itself is of course worth very little." W. E. Broadway 1989 has a label reading "Tobago" in the Britton Herbarium, but N. Y. Sandwith in a note to N. W. Simmonds in March, 1956, says it was collected in the Santa Cruz Mountains, Trinidad, on 5.12.1907. There is, however, no indication that it was taken from a cultivated plant. This Broadway collection is the basis of my recording the species from Tobago in several of my previous publications. It should also be noted here that Vogl 1348 may be from Federal District or Aragua in Venezuela — its label is inscribed merely "Caracas-Maracay".

Lippia micromera has been found on open hillsides, in formerly cultivated ground, dry scrubby woods, yards, xerophytic woods, and xerophytic habitats in general, from 100 to 1980 meters altitude, flowering and fruiting from January to May and July to September. Pittier found it "on arid slopes, gregarious in places" in Lará. Common names recorded for it are "false thyme", "oregano", "oregano del pais" [also applied to var. helleri and to L. origanoides H.B.K.], "oregano poleo", "orégano", "origanum", "small thyme", and "Spanish-thyme". Calpouzos (1954) states that this is one of the many plants called "oregano", "oregeno", "origano", or "oragano", along with L. affinis Schau., L. formosa T. S. Brandeg., L. fragrans Turcz., L. graveolens H.B.K., L. micromera var. helleri (Britton) Moldenke, L. origanoides H.B.K., L. palmeri S. Wats., L. palmeri var. spicata Rose, Lantana involucrata L., L. achyranthifolia Desf., L. trifolia L., Coleus amboinicus Lour., Hedeoma floribunda Standl., H. patens Jones, Hyptis albida H.B.K., H. americana (Aubl.) Urb., H. capitata Jacq., H. suaveolens (L.) Poit., Limnophila stolonifera (Blanco) Merr., Monarda austromontana Epl., Ocimum basilicum L., Origanum vulgare L., O. majorana L., Polio-

mintha longiflora Gray, and Salvia sp. It is used for seasoning meat and to flavor meatloaf, stuffing, and gravy. In Venezuela it is said to be used as a condiment and for medicinal purposes. In Hawaii the leaves are used to flavor soup, meatloaf, etc. In Brazil it is used to season food. In Trinidad it is cultivated as a potherb and sometimes escapes from cultivation. It may be distinguished from the similarly employed L. alba (Mill.) N. E. Br. by its very small leaves which have entire and distinctly revolute margins (or obscurely few-dentate at the apex) and are densely resinous-punctate beneath and by the narrowly lanceolate obtuse bractlets. It should be noted that Killip 37142 has the leaves distinctly toothed.

Material of L. micromera has been misidentified and distributed in herbaria as Hyptis sp. On the other hand, the Ekman H.3619 & H. 12451, J. de J. Jiménez 4329, Leonard & Leonard 12113, and Valeur 147, distributed as L. micromera, are actually var. helleri.

In all, 60 herbarium specimens and 7 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: TRINIDAD: Baptiste s.n. [Maraval] (R--4586); W. E. Broadway 1989 (N); Sieber Fl. Trinit. 86 [Herb. Reichenbach f. 77616, 189448, & 203047] (Cb--cotype, Cb--cotype, N--photo of cotype, V--cotype, V--cotype, V--cotype, Z--photo of cotype). MARGARITA ISLAND: Gines 2790 (W--2174241), 3077 (W--2174393), 3387 (W--2174570), 3711 (W--2174768). COLOMBIA: Norte de Santander: Araque Molina, Otálora, & Barkley 18NSo43, in part (N); Garganta 1126 (F--1294516). VENEZUELA: Angostura: Moritz 492 [Macbride photos 17526] (It--photo of logotype, Kr--photo of logotype, N--photo of logotype, N--photo of logotype, W--photo of logotype). Aragua: Vogl 1348 (N). Federal District: Bailey & Bailey 975 (Ba); Killip 37142 (Ca--37142, N, W--1855325); Vogl 127 (Ve). Lará: H. Pittier 13108 (N, Ve--12779, W--1440410); Saer 484 (Ve--12782); Steyermark 55199 (F--1205141, N); Tamayo 1101 (Ve, W--1800662), 3351 (Ve). Miranda: Barrus s.n. [January 11, 1940] (It). Monagas: Tamayo 3486 (Ve, Ve). Táchira: Tamayo 3700 (Ve--31045); Vareschi 3999 (Ve--42843). State undetermined: Karsten s.n. [Llanos del Orinoco] (V). BRITISH GUIANA: J. S. de la Cruz 953 (N, W--1069847), 1923 (Ba, Cm, N, W--1190367), 3695 (N, W--1282908), 4360 (Ca--299144, Cm, N, W--1232025). CULTIVATED: British Guiana: Archer 2292 (U, W--1663149). Guadeloupe: Duss 2551 (N). Hawaiian Islands: Neal 1235 (Bi, Ca--964556), s.n. [Nov. 17, 1940] (Bi), s.n. [6/24/41] (Bi), s.n. [Sept. 26, 1946] (N); R. Greenfield s.n. [June 19, 1959] (Bi). Trinidad: E. E. Cheesman 177 (N, R--13349). Venezuela: Bailey & Bailey 1326 (Ba, W--1617746); Lasser 769 (Ve--12780).

LIPPIA MICROMERA var. HELLERI (Britton) Moldenke, Revist. Sudam.

Bot. 5: 2. 1937.

Synonymy: Lippia cuneifolia Sessé & Moc., Fl. Mex., ed. 2, 139. 1894 [not L. cuneifolia Steud., 1853, nor Torr., 1937, nor Torr. & Steud., 1962, nor (Torr.) Greene, 1959, nor (Torr.) Steud., 1841, nor Zipp., 1841]. Lippia helleri Britton, Torreya 3: 105. 1903.

Bibliography: Sessé & Moc., Fl. Mex., ed. 2, 139. 1894; N. L. Britton, Torreya 3: 105. 1903; Prain, Ind. Kew. Suppl. 3: 104. 1908; Britton & P. Wils., Scient. Surv. Porto Rico 6: 141—142. 1925; A. W. Hill, Ind. Kew. Suppl. 7: 139. 1929; Moldenke, Revist. Sudam. Bot. 5: 2. 1937; Moldenke, Alph. List Common names 23. 1939; Moldenke, Suppl. List Common Names 14 & 16. 1940; Moldenke, Prelim. Alph. List Invalid Names 30 & 31. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 25—27, 73, & 96. 1942; Moldenke, Alph. List Invalid Names 30 & 31. 1942; Moldenke, Phytologia 2: 107. 1945; Moldenke, Alph. List Cit. 1: 3, 15, 62, 154, 188, 189, 270, & 282. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 63. 1948; Moldenke, Alph. List Cit. 2: 570, 647, & 650 (1948), 3: 653, 654, 689, 782, 867, 925, 938, & 971 (1949), and 4: 1082, 1238, 1247, 1254, 1257, 1259, & 1294. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 44, 48, 49, 162, & 190. 1949; Moldenke, Phytologia 4: 124. 1952; Calpouzos, Econom. Bot. 8: 228. 1954; Alain in León & Alain, Fl. Cuba 4: 288 & 289. 1957; Moldenke, Résumé 52, 57, 58, 220, 312, 313, & 462. 1959; Moldenke, Résumé Suppl. 3: 11. 1962; Moldenke, Phytologia 12: 47, 162, 164, & 190. 1965.

The type of this poorly defined variety was collected by Amos Arthur Heller — in whose honor it was named — and Emily Gertrude Heller (no. 1238) in thickets near Bayamon, Puerto Rico, on April 29, 1899, and is deposited in the Britton Herbarium at the New York Botanical Garden. The type of L. cuneifolia was collected by Martín Sessé y Lacasta, José Mariano Mociño, Juan Diego del Castillo, and José Maldonado (no. 2214) also in Puerto Rico and is deposited in the herbarium of the Jardin Botanico in Madrid. The L. cuneifolia of Steudel, of Torrey, Torrey & Steudel, (Torrey) Greene, and (Torrey) Steudel are all Phyla cuneifolia (Torr.) Greene, while that of Zippelius is P. nodiflora (L.) Greene.

Britton (1903) says "Near L. micromera Schauer, and suspected by Professor Urban to be a cultivated form of that species, but the collector's field notes do not indicate this as probable, and the characters of leaves and of corolla are very different." He gives these characters as follows: "Leaves obovate, 1 cm. long or less, opposite, dull green, puberulent and resinous on both sides, obtuse, crenate, cuneate or narrowed at the base, the slender petiole about 1/4 as long as the blade.....corolla-tube slightly enlarged upward, the limb 2-lipped, the lower lip with a broad middle lobe and 2 smaller lateral ones, the upper lip 2-lobed, all the lobes obtuse; corolla white, tinged with pale purple."

Lippia micromera var. helleri has been found in arid thickets on coastal mountains, in pastures, on arid slopes, limestone terraces,

calcareous hills, and elevated coral reefs, at altitudes from sea-level to 600 meters, flowering from December to May and in September and October, fruiting in April, May, and October. Molina found it "common in matorrales" in Nicaragua. The Leonards found it "in low valley on plateau of cliff-bordered coast" in Haiti. In the Dominican Republic it is described by Jiménez as "very common wild and cultivated as a condiment" and by Allard as "a flavoring sage-like in taste for eatables", while Ekman says "plant not exactly agreeably aromatic, very abundant, a pretty plant". For his H.12451 he notes "cultivated and escaped". Asenjo 146 was actually purchased on the drug market in Puerto Rico. León, Clément, & Roca say of it in Oriente, Cuba: "introduced?"

Collectors describe this plant as a bush or shrub, 1--2 m. tall, the whole plant aromatic, the corollas white. Common names recorded for it are "mejorana", "oregano", "oregano del pais" [applied also to L. micromera Schau. and L. origanoides H.B.K.], and "orégano". Calpouzos (1954) notes that this is one of the many plants called "oregano", "oregeno", "origano", or "oragano", along with the 25 others listed above under the typical form of the species.

Material has been misidentified and distributed in herbaria as L. micromera Schau. and Ocimum basilicum L. On the other hand, the Alain & López F.6982, distributed as L. micromera var. helleri, is actually Lantana parvifolia Desf.

In all, 58 herbarium specimens and 2 mounted photographs, including type material of all the names involved, have been examined by me.

Citations: NICARAGUA: Zelaya: Molina R. 1996 (Ca--10829, G). CUBA: Oriente: Acuña 9870 (Es); Ekman 2887 (S), 8689 (N, S); Hioram 6733 (Z); León 10320 (Ha, N), 11788 (Ha, N); León, Clément, & Roca 10330 (Ha, N). HISPANIOLA: Dominican Republic: B. Augusto 891 (N), 989 (N); Ekman H.12451 (Ca--608098, Mi, N), H.12461 (S); Fuertes 855 (S); Howard & Howard 9573 (N); J. de J. Jiménez 4329 (W--2351608); Lavastre 1857 (N). Haiti: Ekman H.3619 (Ca--608094, Mi, S), H.3947 (N, S); Leonard & Leonard 11068 (Mi), 11929 (Ba), 12113 (Ca--439877, Cm), 12580 (N). PUERTO RICO: Asenjo 146 (As); Britton & Britton 9532 (N); Britton & Cowell 890 (N); Eggers 1275 (Cp); Heller & Heller 1238 (N--type); Herb. Ames s.n. [July 1915] (Oa--9973); Otero & Lopez s.n. [Otero 473] (Bt--49937, Du--292517, Kr, N); Sessé, Mociño, Castillo, & Maldonado 2214 (N--photo, Q, Z--photo); Sintenis 3671 (S); Stevens & Hess 3413 (N). CULTIVATED: Cuba: Acuña 17435 (Es). Dominican Republic: H. A. Allard 14432 (S); Valeur 147 (Ca--445662, Cp, Du--202974, Gg--182923, Gg--182982, Mi, N, S). Puerto Rico: Britton & Britton 9293 (N); J. A. Stevenson 3933 (N).

LIPPIA MICROMERA var. PALUDICOLA Moldenke, Phytologia 1: 468--469.

1940.

Bibliography: Moldenke, Phytologia 1: 468—469 (1940) and 1: 504. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Cit. 1: 44. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Résumé 94 & 462. 1959.

This variety differs from the typical form of the species in having its branchlets and twigs merely densely pulverulent-punctate, instead of spreading short-pubescent, and in having its petioles and the very narrow and entire leaf-blades also merely pulverulent-punctate on both surfaces, instead of short-pubescent or puberulent.

The type of this variety was collected by Jacques Samuel Blanchet (no. 2872) in swamps at Ilhabina, Jacobina, Bahia, Brazil, in 1839, and is deposited in the Meisner Herbarium at the New York Botanical Garden. Thus far the variety is known to me only from the type collection. In all, 5 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Bahia: Blanchet 2872 (Br--isotype, Br—isotype, Br--isotype, Lu--isotype, M—type).

LIPPIA MICROPHYLLA Cham., Linnaea 7: 226. 1832 [not L. microphylla Benth., 1894, nor F. Phil., 1865, nor R. A. Phil., 1951].

Synonymy: Lippia microphylla var. foliis acutiusculis Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97. 1877. Lippia microphylla var. fasciculata Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97. 1877. Lantana microphylla Cham. ex Moldenke, Alph. List Invalid Names Suppl. 1: 12, in syn. 1947 [not L. microphylla Franchet, 1882, nor Mart., 1894]. Lippia microphylla Mart. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia microphylla Cham. & Schlecht., in herb.

Bibliography: Cham., Linnaea 7: 226. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 598. 1843; Walp., Repert. Bot. Syst. 4: 51. 1845; Schau. in A. DC., Prodr. 11: 577. 1847; Schau. in Mart., Fl. Bras. 9: 228. 1851; Bocq., Adansonia 3: 244. 1863; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 540. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Cit. 1: 43 & 121. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 12 & 14. 1947; Moldenke, Alph. List Cit. 2: 485, 486, & 553 (1948), 3: 689, 815, 916, & 923 (1949), and 4: 1176, 1204, 1235, 1293, & 1300. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 349. 1951; Moldenke, Phytologia 4: 70. 1952; Moldenke, Résumé 75, 94, 306, 314, & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 7: 329. 1961; Moldenke, Résumé Suppl. 10: 6. 1964; Moldenke, Phytologia 12: 118, 169, 170, & 224. 1965.

Bushy much-branched shrub, 0.5—2 m. tall, with a strong odor; branches obsoletely tetragonal, the bark peeling off in a layer of fibrous strips; branchlets subterete, canescent-pubescent, the

youngest villous, the terminal ones often virgate; leaves small, decussate-opposite, petiolate, decreasing in size toward the apex of the branchlets; leaf-blades ovate or elliptic to suborbicular, dark-green above, 6--18 mm. long, 4--14 mm. wide, obtuse at the apex, rather long-attenuate into the petiole at the base, crenate along the margins, penninerved, rugose, densely strigose-holosericeous above or finally scabrous, more softly incanous-tomentose beneath; inflorescence axillary; peduncles aggregate, lax, 4--6 mm. long, villous; heads tetraquetrous, subglobose or ovoid, 6--8 mm. long, shorter than the lower subtending leaves, surpassing the upper ones; bractlets green, lanceolate, with a subulate inflexed acumination at the apex, patulous, loosely imbricate, equaling the corolla-tube, incanous-villous; calyx ovate, 1 mm. long, bifid, pubescent, ciliate, the lobes bidentate; corolla hypocrateriform, white or yellowish to dark-red (?), blackening in drying, the tube slender, straight, ventricose at the middle, villous, slightly over 3 mm. long, the limb small, villous on the back, the lobes short, the upper lip rounded, the lower lip with its middle lobe subquadrate, obtusely angled, and entire, the lateral lobes ovate and obtuse.

This species was based on a specimen collected by Friedrich Sellow in the Serra da Moeda and on specimens collected by Georg Wilhelm Freyreiss near Caravellos and in the higher Serra dos Orgaos mountains in Rio de Janeiro, Brazil. The Sellow specimen was deposited in the herbarium of the Botanisches Museum in Berlin, where it was photographed by Macbride as his type photograph number 17527, but is now destroyed, while the other specimens are in the Beyrich herbarium. The type of L. microphylla Mart. was gathered by Peter Clausen (no. 3851) in Minas Gerais, Brazil, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels; Lantana microphylla Mart. is based on Glaziou 13477, also in the Brussels herbarium. It should be noted here that Lippia microphylla F. Phil. and L. microphylla R. A. Phil. are synonyms of Acantholippia deserticola (F. Phil.) Moldenke, Lippia microphylla Benth. is a synonym of L. schomburgkiana Schau., Lippia microphylla f. glabriuscula Kuntze is a synonym of L. turbinata Griseb., Lantana microphylla Franch. is a synonym of Lantana petitiana A. Rich., and Lantana microphylla Mart. belongs in the synonymy of Verbena microphylla H.B.K.

Schauer (1847) places Lippia microphylla in his Section Goniostachyum. The plant has been found in fields, on stony slopes with sandy soil, and on terra firma, at altitudes of 1300 to 2000 meters, flowering from May to July, September, October, and December. The Maguires describe it as "frequent on rock outcrops in savannas" in Rio Branco. The flowers are described as "white" on Maguire & Maguire 40286, Willism s.n., Mello Barreto 15010, and Macedo 2359, and as "vermelhas" on Murça Pires & Black 2536. Schauer speaks of them as yellowish, but blackening in drying. Material has been misidentified and distributed in herbaria as L.

schomburgkiana Schau., a species to which this one is obviously very closely related. On the other hand, the Glaziou 19708, distributed as L. microphylla, is actually L. pohliana Schau.

Schauer (1851) cites P. Clausen 385 and Riedel s.n. [in prov. Minarum siccis umbrosis prope oppidulum S. Luciae et in collibus siccis ad Sabara] & s.n. [in fructiferis prope Villa-Rica] from Minas Gerais, Sellow s.n. [in montibus Serra da Moeda et in elatioribus Serra dos Orgaos] from Rio de Janeiro, and Freyreiss s.n. [in prov. Porto Seguro prope Caravelas] from Bahia. Glaziou (1911) cites also his no. 19708 from Minas Gerais.

In all, 31 herbarium specimens, including type material of all the names involved, and 5 mounted photographs have been examined by me.

Citations: BRITISH GUIANA: G. H. H. Tate 359 (N). BRAZIL: Bahia: Blanchet 3649 (Br, N); Freyreiss s.n. [e Brasilia] (N, S). Goiás: G. Gardner 4332 (M). Maranhão: Eiten & Eiten 4492 (W—2445202); Murça Pires & Black 16114a (Hk), 2336 (Z), 2536 (N). Minas Gerais: P. Clausen 3851 (Br), s.n. [Aug.-April 1840] (Br, Br), s.n. [1840], s.n. (Du—166579); Glaziou 14155, in part (Br); F. C. Hoehne Com. Rondon 6110 (N); Macedo 2359 (N, S); Mello Barreto 3210 (Ja—32309); Mendes Magalhães 19228 [Herb. Brad. 28162] (N); Schwacke s.n. (Ja—14898). Paraíba: Pickel 3936 (N). Rio Branco: Maguire & Maguire 40286 (N); William s.n. [Herb. Inst. Nac. Pesq. Amaz. 518] (Ok). Rio de Janeiro: Glaziou 13064 (W—1194854), 13477 (Br); Mello Barreto 15010 [Herb. Jard. Bot. Belo Horiz. 45150] (N); Sellow s.n. [Brasilia; Macbride photos 17527] (Br—cotype, Kr—photo of cotype, N—cotype, N—photo of cotype, N—photo of cotype, N—photo of cotype, Vt—cotype, W—photo of cotype).

LIPPIA MODESTA Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 311—312. 1904.

Bibliography: Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 311—312. 1904; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1157. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 493. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96 (1942) and [ed. 2], 99 & 190. 1949; Moldenke, Résumé 117 & 462. 1959; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Troncoso, Darwiniana 12: 258, 275, & 276, fig. 9. 1961; Moldenke, Phytologia 12: 24, 135, & 136. 1965.

Illustrations: Troncoso, Darwiniana 12: 276, fig. 9. 1961.

Perennial dioecious herb or small subshrub, with a heavy creeping rhizome; serial stems simple or few-branched, 8—15 cm. tall, sparsely and antrorsely appressed-strigose; middle internodes 2—3 cm. long; leaves decussate-opposite, short-petiolate; petioles 2—5 mm. long; lower leaf-blades ovate, 1—2.5 cm. long, 1—2 cm. wide, obtuse or subobtuse at the apex, convex along the margins, rounded at the base, the upper ones larger, ovate-lanceolate or

lanceolate, 4--6 cm. long, 1--2.5 cm. wide, more acute or very acute at the apex, long-convex along the upper margins and more convex below the middle, all rather rigid, green on both surfaces, coarsely crenate-serrate along the margins with teeth 1--1.5 mm. long and 2--5 mm. apart, sparsely and antrorsely appressed-strigose, roughened but not scabrous above, the venation pennineryed, subreticulate, not at all or only slightly impressed above; secondaries 4 or 5, often slightly prominulous beneath; inflorescence axillary, rather long-pedunculate; peduncles 1.5--2.5 cm. long, slender, barely equaling the subtending leaves, appressed-strigose with short antrorse hairs, with a few small stipitate glands below the head; heads about the size of a pea (Pisum sativum), about 7 mm. long and 6 mm. wide, cinereous; bractlets ovate, acuminate at the apex, densely strigose-pubescent on the back, the lowest 3--5 mm. long, somewhat surpassing the flowers, the rest about equaling the flowers in length; calyx minute, campanulate, scarcely 0.5 mm. long, densely pubescent on the outside, obscurely bilabiate, the lips subentire; corolla hypocrateriform, yellow, its tube surpassing the calyx-mouth by 3 mm., rather densely puberulent above, the limb 4-lobed, the lobes small, ovate, scarcely 0.5 mm. long, the anterior one longer; stamens and pistils normal for the genus, included; mericarps smooth, about 1.5 mm. long, separating with the densely pubescent calyx-segments.

The type of this species was collected by Benedict Balansa (no. 1036c) on the plain west of Cerro Peron near Pirayu, Paraguay, in June, 1874, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. Briquet (1904) says: "Cette espèce est à peu près intermédiaire entre le L. asperrima Cham. et le L. trachyphylla Briq. ci-après décrit. Elle est characterisée par une heterophyllie assez marqués, des feuilles à peine rudes et non pas vraiment scabres et bien moins rugueuses que dans ces deux espèces. L'indument des pédoncules ressemble à celui du L. trachyphylla, mais ceux-ci sont plus allongés et plus tenus. Autant qu'on peut en juger sur le sec, la corolle paraît être jaune comme dans le L. asperrima."

Troncoso (1961) cites the following specimens not as yet seen by me: PARAGUAY: Balansa 1036c (P--isotype); Hassler 6175 (Bm), 11590 (Bm, K, Le). ARGENTINA: Jujuy: Cabrera 7852 (Si). Salta: Vattuone 28 (Si); Venturi 5067 (Si), 10597 (Si). Of these she says that Vattuone 28 and Venturi 5067 are staminate, while Balansa 1036c and Venturi 10597 consist of both staminate and pistillate specimens. She comments: "Especie muy afín a L. contermina Briq.. Se diferencia por la pubescencia, L. modesta presenta pelos estrigosos en tallos, hojas, pedúnculos y brácteas, a veces pelitos glandulosos muy breves en el ápice de los pedúnculos y de las brácteas. L. contermina posee tallos, pedúnculos, brácteas, pecíolos y envés de las hojas densamente viscoso-glanduloso-pilosos. Es una planta dioica."

Nothing is known to me about this species except what is stated

in the literature.

LIPPIA MORITZII Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863.
Synonymy: Lippia floribunda Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 237. 1900 [not L. floribunda Hort., 1959, nor H.B.K., 1817, nor Humb. & Bonpl., 1841, nor Humb. & Kunth, 1843, nor Kunth, 1825, nor R. A. Phil., 1891]. Lippia briquetii Moldenke, Torreya 34: 9. 1934. Lippia venezuelensis Moldenke ex H. Pittier, Supl. Pl. Usual. Venez. 62 & 119, in syn. 1939.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl., ed. quart., 2: 267. 1818; Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863; R. A. Phil., Anal. Mus. Nac. Chile Bot. 1: 59. 1891; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 237. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Moldenke, Torreya 34: 9. 1934; A. W. Hill, Ind. Kew. Suppl. 9: 161. 1938; H. Pittier, Supl. Pl. Usual. Venez. 55, 62, & 119. 1939; Moldenke, Alph. List Common Names 2. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32, 95, & 96. 1942; Moldenke, Phytologia 2: 107. 1945; Moldenke, Alph. List Cit. 1: 7 & 22. 1946; Moldenke, Alph. List Invalid Names 16. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 51 & 73. 1948; Moldenke, Alph. List Cit. 2: 352, 580, & 634 (1948), 3: 820 & 974 (1949), and 4: 1075, 1079, & 1132. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 60, 63, 189, & 190. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 9. 1949; Moldenke, Résumé 67, 71, 318, 461, & 462. 1959; Moldenke, Résumé Suppl. 1: 5, 19, & 25 (1959) and 2: 4 & 9. 1960; Moldenke, Phytologia 12: 79, 111, 207, & 208. 1965.

Shrub, herbaceous shrub, or small tree, 2.5--15 m. tall; trunk thick, 10--25 cm. in diameter at breast height; bark dark-gray, rough, cracking off in thick plates; branches tetragonal, densely pubescent at the apex; leaves decussate-opposite, petiolate; petioles densely pubescent; leaf-blades ovate-lanceolate, acuminate at the apex, somewhat narrowed at the base, serrate along the margins almost to the base, scabrous, bullate-rugose above, reticulate beneath; inflorescence densely pubescent, the axillary panicles pedunculate, the terminal ones sessile, considerably compacted, trichotomous, the ultimate branches racemose; heads ovate, small, about the size of those of L. americana L.; bractlets ciliate along the margins, not on the back; flowers small; corolla white or cream-white to yellowish [or "purple"?].

The type of this species was collected by Johan Wilhelm Karl Moritz (no. 1640) -- in whose honor it was named -- near Colonia Tovar, Aragua, Venezuela. The type of L. floribunda and L. briquetii was collected by August Fendler (no. 863), also in Aragua.

It should be noted here that the L. floribunda of H.B.K., of Humb. & Bonpl., of Humb. & Kunth, and of Kunth are L. americana L., that of R. A. Phil. is Aloysia reichii Moldenke, and that of Hort. is Lantana achyranthifolia Desf. The Trinta 2043 & 3684, distrib-

uted as L. floribunda, are L. schlimii var. glabrescens (Moldenke) Moldenke. Material of L. moritzii has been misidentified and distributed in herbaria under the names L. callicarpaefolia H.B.K., L. floribunda H.B.K., L. hirsuta L., L. hirsuta L. f., Buddleia sp., and Hyptis sp. On the other hand, the Cuatrecasas 13572, García y Barriga 11011, Herb. Mus. Paris 1, Little & Little 9228 & 9795, F. W. Pennell 2462, and Triana 148, distributed as L. moritzii, are actually all L. hirsuta L. f.

Lippia moritzii has been found growing on hills and densely wooded slopes, in meadows, bushes, woods, thickets, and forests, dwarf forests, open canyon bottoms in dwarf forests, "lomas aridas", and land of the disturbed paramillo shrub type, at altitudes of 800 to 3200 meters, flowering from May to March, fruiting from September to January and in March and July.

Bernardi describes the plant as follows: "arbol pequeño, corteza escamosa, de color claro, florecitas cremosas; hojas discoloras, envés mas claro, haz manchado de blanco asperos y aromático". Common names recorded for it are "amogre", "cariaque", "mérida", "mogre", and "salvia". The flowers are described as "white" on Fosberg 22193, H. Pittier 9966 & 13779, and Sneidern 3016, as "cream-white" on Williams & Alston 18, as "yellowish" on H. Pittier 9870, and as "purple" on H. Pittier 9869. The Jahn 1140 cited below from Trujillo may actually have been collected in Mérida, since its label is merely inscribed "La Puerto to Timotes".

In all, 51 herbarium specimens and 5 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: COLOMBIA: Boyacá: Cuatrecasas 1863 (W--1773188); F. R. Fosberg 22193 (N). Caldas: Sneidern 3016 (S), 3089 (S). Cundinamarca: Køie 4524 (Cp, Z); Triana 2049 (Br). Magdalena: Seifritz 397 (W--1572471). Department undetermined: Henri 1 [San Cristóbal] (W--2383065). VENEZUELA: Aragua: Allart 288, in part (Ve--12773), 288a (W--1231237); Fendler 863 (Br, F--photo, N, N--photo, Si--photo, Z--photo); Lasser & Foldats 4276 (Ve); Moritz 1640 (Z--photo of type); H. Pittier 9966 (N, W--1186992); Steyermark 91592 (Ve). Federal District: Allart 85 (N, Ve--12777, W--1199018), 167 (N, Ve, W--1231158); Badillo 694 (Ve--12770); Bailey & Bailey 994 (Ba, W--1198400); Delgado 54 (Ve--12771, W--1692661), 507 (Ve); Eggers 13580 (Lu, S, W--939323, W--1234732); Lasser 1008 (W--1878281), s.n. [Steyermark 55099] (F--1205145); H. Pittier 9869 (W--1186477), 9870 (N, W--1186478), 9966 (N), 12251 (Kr), 13779 (Ve--12772, W--1740474); Ll. Williams 10625 (Ve--12769), 12251 (Ca--734500, W--1778908); Williams & Alston 18 [Ll. Williams 10625] (Ve--12768). Mérida: Bernardi 3735 (Ve), 6399 (N). Miranda: Allart 288, in part (N). Trujillo: Jahn 1140 (Ve, W--1186740).

LIPPIA MORONGII Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898.

Synonymy: Lippia angustifolia Morong ex Kuntze, Rev. Gen. Pl. 3 (2): 253, in syn. 1898 [not L. angustifolia Cham., 1832].

Bibliography: Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 196. 1892; Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 314—315. 1904; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1159. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 494. 1904; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Hassler, Fl. Pilc. 102. 1909; Herter, Revist. Sudam. Bot. 4: 186. 1937; Moldenke, Lilloa 5: 424. 1940; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Alph. List Invalid Names 29. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41, 43, & 96. 1942; Moldenke, Lilloa 8: 424. 1942; Augusto, Fl. Rio Grande do Sul 235. 1946; Moldenke, Phytologia 2: 385 & 386. 1947; Moldenke, Lilloa 14: 44 & 45. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 73. 1948; Moldenke, Alph. List Cit. 2: 357, 358, 441, 532, 628, & 629 (1948) and 3: 689, 704, 705, 749, 863, 875, & 913. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 99, 100, 105, & 190. 1949; Moldenke, Phytologia 3: 376 (1950) and 5: 96. 1954; Moldenke, Inform. Mold. Set 49 Spec. 2. 1954; Moldenke, Résumé 94, 117, 119, 125, 310, 314, & 462. 1959; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Moldenke, Phytologia 12: 84, 90, 92, 93, & 136. 1965.

Suffrutescent, 3--12 dm. tall, dioecious; stems tetragonal, appressed-hairy; internodes elongate; leaves decussate-opposite, sessile or short-petiolate; leaf-blades narrowly lanceolate, 6—10 cm. long, 1--1.5 cm. wide, serrate along the margins with many teeth, attenuate into the petiole at the base, appressed-hairy, divaricately penninerved, not 3-plinerved, the secondaries spreading, not ascending; inflorescence not paniculate; peduncles axillary, equaling or longer than the upper scarcely smaller leaves; heads small; flowers small, nearly concealed by the cuspidate-acuminate bractlets; corolla hypocrateriform, yellow or clear-yellow and rose, usually at first yellow, turning orange or orange-rose in age.

The type of this species was collected by Thomas Morong (no. 860) -- in whose honor it was named -- among tall grass on a campo at the Pilcomayo River, Paraguay, on January 9, 1890, where it is described as being "common", and is deposited in the Columbia University Herbarium at the New York Botanical Garden. It is listed in Morong's field notebook no. 4, page 8.

Kuntze (1898) says "L. angustifolia Morong 'Cham.' [sed non Cham.] in Paraguay Plants 196. Ab L. angustifolia a differt foliis serratis dentibus multis, in petiolum brevem attenuatis divaricato-pinnatinervis (haud triplinervis cum nervis ceteris adscendentibus); inflorescentia haud paniculata, ob folia summa haud deminuta, pedunculo aequilongo vel longior. Concepcion de Paraguay. Morong beschreibt die Art ziemlich gut, aber ausser den Bluthen und Bracteen weicht sie von L. angustifolia bedeutend ab."

Briquet (1904) comments: "M. Kuntze.....a attire l'attention sur le fait que le L. angustifolia de Morong diffère totalement de celui de Chamisso. Le premier appartient au groupe des Zapania à pedoncules axillaires (d'ailleurs de moitié au moins plus courts que les feuilles), tandis que le second appartient au groupe de cette section à panicule terminale. Le L. Morongii ressemble beaucoup dans ses formes réduites au L. turnerifolia β angusta, quoique le plus souvent son port plus robuste et ses feuilles moins rugueuses le fassent facilement reconnaître. Il s'en distingue essentiellement par l'absence de poils allongés et ± étalés, exclusivement remplacés par de poils strigueux ascendants et courts; en outre, les bractéoles extérieures des capitules sont largement ovées-acuminées."

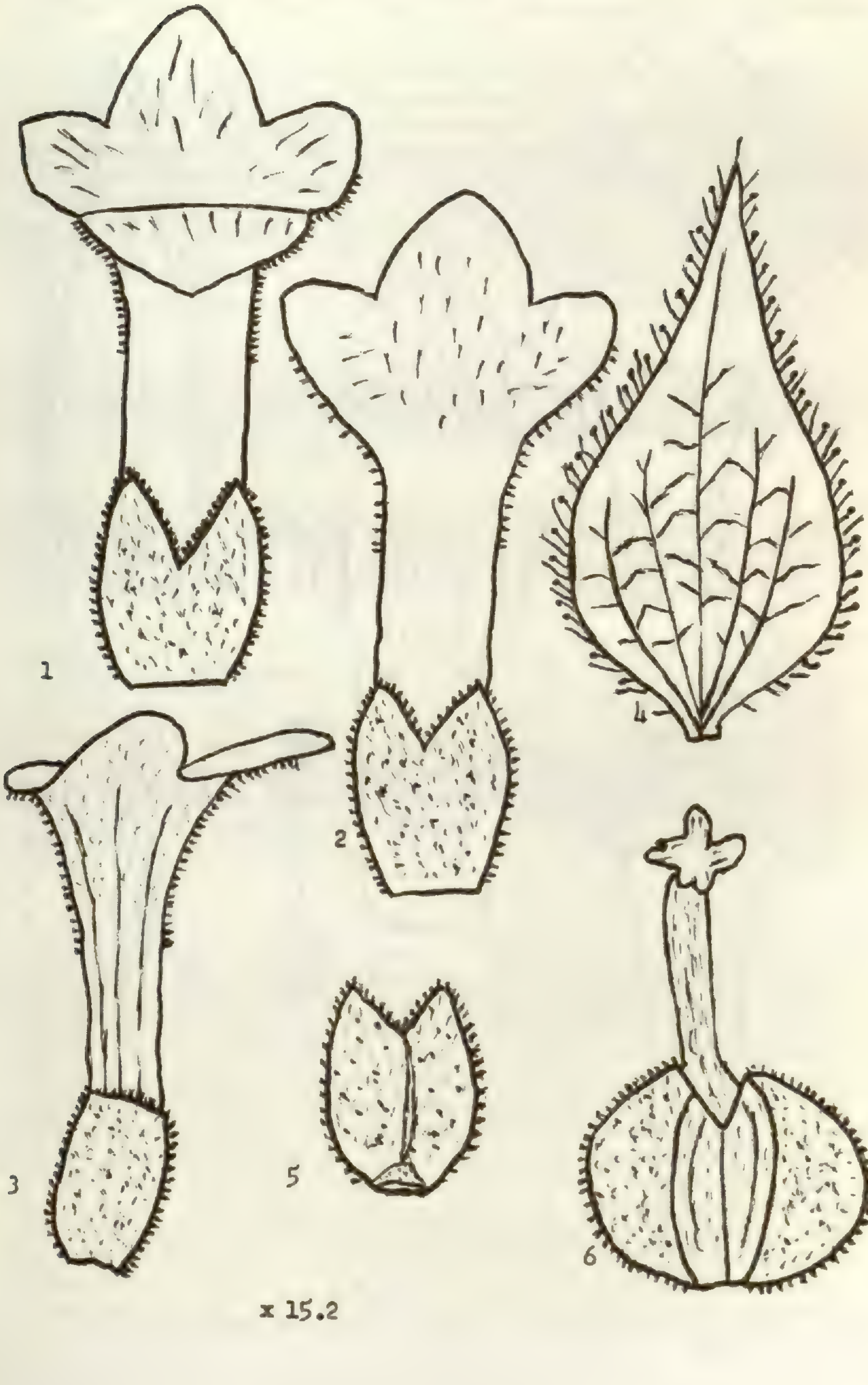
The species has been found growing in dry sandy sunny soil, on open or dry exposed sandy campos, wet sandy campos, and spiny or shrubby campos, at altitudes of 40--60 meters, flowering from October to February and in April. Rosengurtt refers to it as "escasa en praderas". A vernacular name recorded for it is "salvia de flores amarillas". Meyer calls it "rather rare in fertile ground".

Material has been misidentified and distributed in herbaria under the names L. asperrima Cham., L. asperrima var. longipedunculata Moldenke, L. imbricata Kuntze, L. turneraefolia Cham., L. turnerifolia Cham., L. turnerifolia Cham. & Schlecht., and Lantana turneraefolia Cham. Meyer 255b was determined as "Lippia asperrima forma?" by Osten.

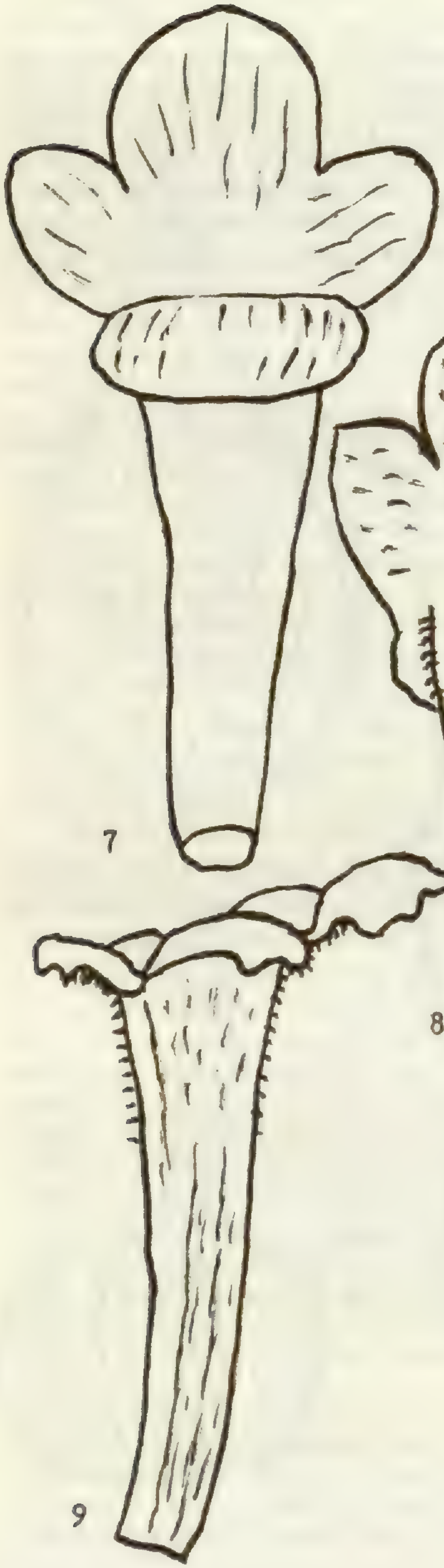
The corollas are described as "yellow" on Herter 989, Malme 1078 & 2791, T. Meyer 291, Rambo 25783, and A. G. Schulz 8683, as "clear yellow and rose" on T. Rojas 2541, and as "at first yellow, later orange-rose" on A. G. Schulz 8685.

A. G. Schulz describes the two types of flowers in this species, as exemplified by his nos. 8683 and 8685, as follows: 8683 -- la flor no es rojiza pasada la antesis; caliz alto; bractea abarquillada; flor amarilla; campo-prado, suelo fertil. 8685 -- campo-prado, suelo alto, fertil; flor amarilla, luego rojiza-anaranjada; pasada la antesis la flor es rojiza o anaranjada; caliz muy bajo; bractea plana, estacha." His illustrations of the floral parts of these two types of flowers are reproduced in the following text figures: ["dibujos a camera clara x 20; 26-II-1954"]

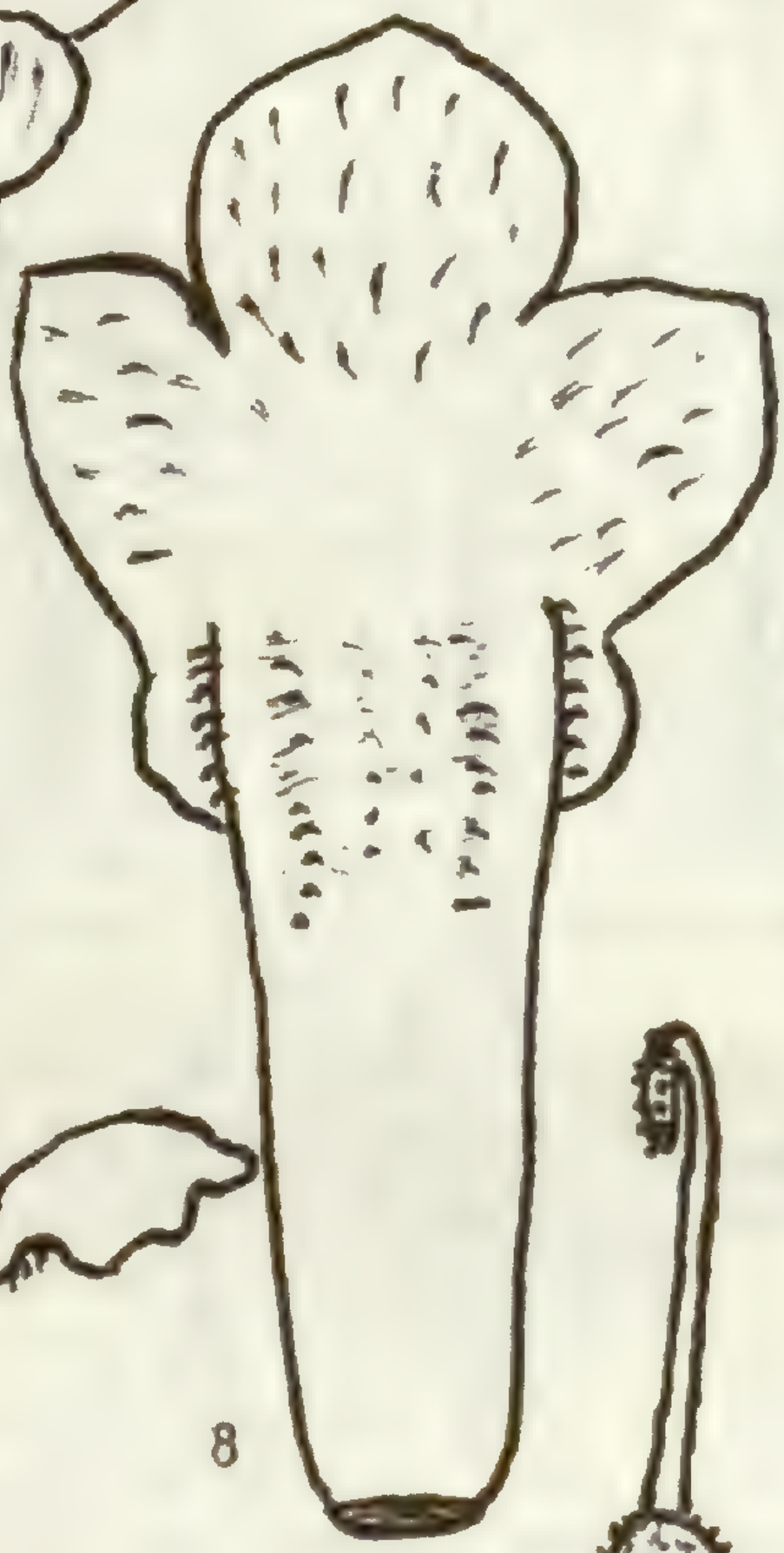
Fig. 1 — 8683, calyx and corolla seen from the front
Fig. 2 -- 8683, calyx and corolla seen from the back
Fig. 3 -- 8683, calyx and corolla seen from the side
Fig. 4 — 8683, bractlet (boat-shaped, the veins anastomosing)
Fig. 5 -- 8683, calyx
Fig. 6 — 8683, fruit
Fig. 7 -- 8685, corolla seen from the front
Fig. 8 — 8685, corolla seen from the back
Fig. 9 -- 8685, corolla seen from the side
Fig. 10 -- 8685, bractlet (flat, veins not anastomosing)
Fig. 11 — 8685, gynoecium
Fig. 12 — 8685, calyx



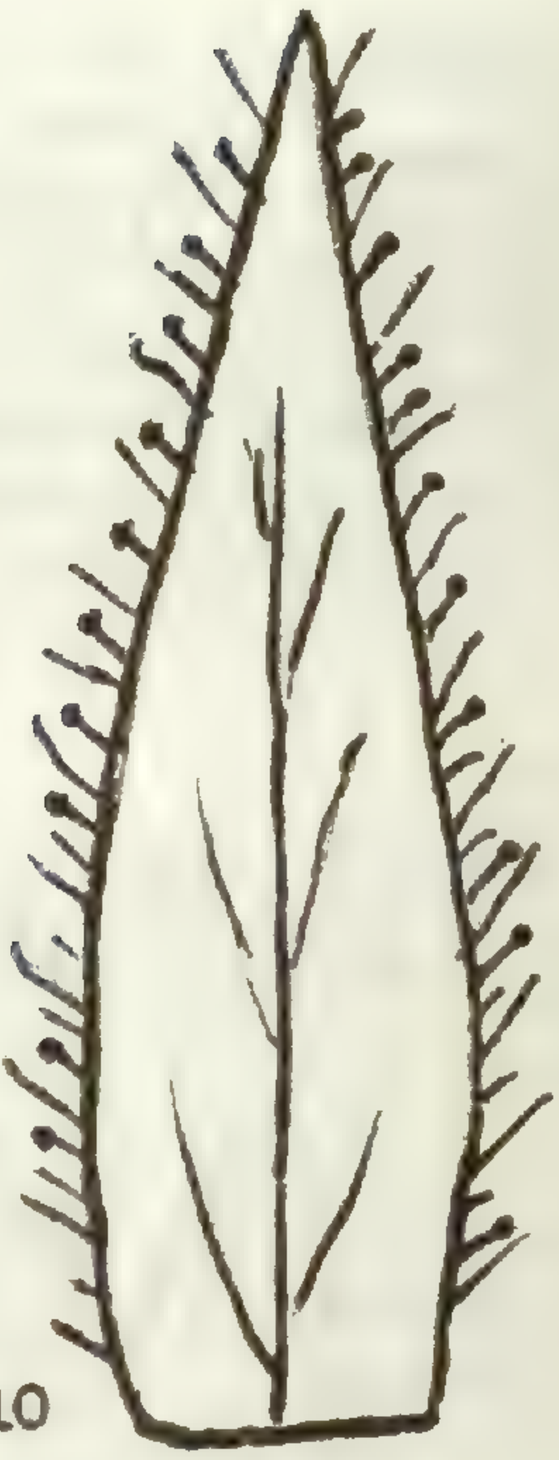

x 15.2



7



8



10



9

11

12

x 15.2

The Grüner 597, Herb. Osten 23175, and Osten 9012, distributed as L. morongii, are actually L. recolletae Morong.

In all, 33 herbarium specimens, including the type, and 3 mounted photographs have been examined by me.

Citations: BRAZIL: Matto Grosso: Malme 2791 (N, S). Rio Grande do Sul: Rambo 25783 (Rb). PARAGUAY: Kuntze s.n. [Nord Paraguay, IX.92; Macbride photos 17528] (Kr--photo, N, N--photo, W--701016, W--photo); Malme 1078 (S, S); T. Meyer 16038 (N); Morong 575 (C, W--72477, W--1417058), 860 (C--type, C--isotype, W--72762--isotype, W--1417055--isotype); T. Rojas 2541 [Herb. Osten 18188] (Ug). URUGUAY: Arechavaleta 15 (Cb); Herter 989 [Herb. Herter 82594] (B, Ca--323325, N, N, S, W--1344189); Rosengurtt B.3383 (N). ARGENTINA: Chaco: T. Meyer 255b [Herb. Osten 22947] (Ug), 291 (Ug--10939), 8755 (N); A. G. Schulz 1498 (N), 8683 (Cb, Hk), 8685 (Hk, Z). Misiones: Bertoni 2450 (N); D. Rodriguez 409 [Herb. Mus. Argent. Cienc. Nat. 16278] (N).

LIPPIA MULTIFLORA Moldenke, Phytologia 3: 168--169. 1949.

Bibliography: Moldenke, Phytologia 3: 168--169 (1949), 3: 291 & 292 (1950), and 3: 466. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 133, 137--140, 142, 220, & 462. 1959.

Herbaceous or shrubby, 1.1--3 m. tall, very odorous; stems and branches medium-slender or rather stoutish, obtusely tetragonal, sparsely appressed-strigillose and more or less gramulose, not at all scabrous, often purplish, often canaliculate; nodes distinctly annulate; leaves whorled, mostly ternate; petioles slender, 2--5 mm. long, appressed-strigillose and gramulose, more or less margined; leaf-blades firmly chartaceous, rather thick-textured and stiff, mostly erect, narrow-elliptic, 5.5--13 cm. long, 1--3.3 cm. wide, rather grayish-green, lighter beneath, attenuate-acute at both ends, uniformly serrulate from below the middle to the apex, strigillose on the upper surface with bulbous-based hairs but not at all or but very obscurely scabrellous, densely puberulent and resinous-gramulose beneath; midrib slender, plane or very slightly impressed above, prominent beneath; secondaries very slender, 10 or more per side, plane or very slightly impressed above, promimulous beneath, ascending, slightly arcuate, terminating in the simuses between the marginal teeth; vein and veinlet reticulation abundant, regular, occasionally slightly subimpressed above, subpromimulous beneath; inflorescence aggregated at the tips of the stems and branches in paniculate fashion, often to 20 cm. long and 10 cm. wide; peduncles similar to the upper part of the stems or branches and continuous with them, similar in texture and pubescence, about 8 cm. long; inflorescence-branches slender, 2--8 cm. long, the lower ones longest and usually ternate in the axils of the foliaceous bracts that are 2--3 cm. long and similar to the leaves in all other characters, the upper irregularly clustered in the axils of smaller and narrower bracts; spikes subcapitate in

anthesis, becoming cylindric-oblong and to 2 cm. long, congested on densely appressed-pubescent stalks 3--10 mm. long, densely many-flowered; lowermost bractlets broadly ovate, about 3 mm. long and 2 mm. wide, the upper ones obovate and somewhat smaller, all densely imbricate, short-acuminate at the apex, densely white-villosulous with appressed antrorse hairs on the back; flowers very small, the calyx densely spreading-hirsutulous, the white or whitish corollas with an infundibular tube about 2 mm. long, very slender at the base, ampliate to 1 mm. at the apex, the slender portion glabrous, the expanded portion strigillose on the outer surface, the limb irregularly 2-lipped, the upper lip erect, about 1 mm. long, the lower lip 3-lobed, the lobes about 0.5 mm. long, ovate.

The type of this apparently widespread species was collected by Charles Barter (no. 768), probably in Northern Nigeria, while on Dr. Baikie's Niger Expedition between 1857 and 1859, and is deposited in the Torrey Herbarium at the New York Botanical Garden. I am indebted to my colleague, R. D. Meikle, of the Royal Botanic Gardens, Kew, for pointing out to me the differences between this species and L. rugosa A. Chev., with which it had previously been confused by me. In a letter to me dated September 9, 1949, he says that the type specimen of L. rugosa has very scabrid leaves and stems and long-acuminate and rather thinly pubescent flowering bracts, whereas the leaves of L. multiflora are at most only very slightly scabridulous, the stems are smooth, and the flowering bracts are densely white-tomentose and only short-acuminate.

Lippia multiflora has been found at altitudes of 480 to 820 meters, flowering from January to August and in October, fruiting in April and July, growing on savannas and at the edge of water. Mullenders reports finding it on the Marrais Exonde formation. Thonner reports it "very common" in the Congo. Jespersen comments "l'odeur est très oenetrante", while Belot says "odeur légère". Lebrun says "Tiges canées; infl. regular. etalée en ombelles, globuleux." The plant is cultivated in the Congo to extract a perfume, and is used by the natives as a vomitive and as a medicine in the treatment of stomach ache.

Common names recorded for this plant are "angasagne", "angasay", "bonjutu", "bulukutu", "ebolo", "esisi", "likangano", "lokindola", "makubambo", "niemba", and "niembe". The corollas are described as "white" on Bequaert 7630, Johnson 584, Lebrun 3143, Mullenders 647, and Thonner 234, and as "whitish" on Laurent & Laurent s.n. [27.10.03]. Material has been misidentified and distributed in herbaria under the names L. adoënsis Hochst., L. nigeriensis Moldenke, L. rugosa A. Chev., Acrocephalus masuianus Briq., and even Vernonia sp.

In all, 155 herbarium specimens, including the type, have been examined by me.

Citations: DAHOMEY: Poisson s.n. (S). SIERRA LEONE: Smythe 121 (K). GHANA: Johnson 584 (K); Kitson s.n. [Gold Coast, 1916] (N); Vigne 1813 (Br), 3889 (K). TOGOLAND: Baumann 401 (Br, N). NIGERIA:

Northern: Barter 768 (S--isotype, T--type, Ut--11489--isotype). Southern: Millen 143 (K). CAMEROONS: Zenker & Staudt 562 (S). CONGO BRAZZAVILLE: Hakanson 3019 (S); Soyaux 67 (K). CENTRAL AFRICAN REPUBLIC: A. Chevalier 5395 (Br). CONGO LEOPOLDVILLE: Allard 19 (Br); Belot 45 (Br); Bequaert 547 (Br), 2764 (Br), 7396 (Br), 7630 (Br); Blommaert 147 (Br); Claessens 3 (Br), 5 (Br), s.n. [env. de Boma, 1921] (Br, Br); Collector undesignated 178 (Br), 388 (Br), 388 bis (Br); Corbisier-Balanot 880 (Br, Br); Coûteaux G.278 (Br); Dacrémont 239 (Br, Br, Br); De Giorgi 211 (Br); De Graer 33 (Br); Dewevre 388 (Br); De Wulf 185 (Br); Dobbelaere 23 (Br); Dubois 330 (Br, Br, Br); Dupuis s.n. [1894] (Br), s.n. [Binguela] (Br, Br, Br, Br, Br); Egger 1911 (Br); Elskens s.n. [20 juillet 1918] (Br); Feller A.19 (Br); Flamigni 118 (Br); Gillet 31 (Br), 917 (Br), 3672 (Br), s.n. [1898] (Br); A. P. G. Goossens 4896 (Br, S), 5074 (Br, N, S); V. Goossens 1260 (Br); Hendrick & Gillet 3088 (Br); Herb. Jard. Bot. Brux. "D" (Br); Herb. Mus. Congo s.n. [1942] (Br); Lambueroy 78 (Br); M. Laurent 165 (Br), 739 (Br), 1917 (Br), 1948 (Br); Laurent & Laurent s.n. [27.10.03] (Br), s.n. [Bas Ubangi, 18/11/03] (Br), s.n. [4/1/06] (Br); Lebrun 3143 (Br), 6747 (Ca--915227); Ledoux & Huyghe 9 (Br); Leemans 418 (Br, Br, Br); Luja 189 (Br); Montagne 34 (Br), 151 (Br); Mortehan 132 (Br); Mullenders 647 (Br); Nannan 151 (Br); Nélis s.n. [Bokala, Mai 13, 1913] (Br), s.n. [Bokala, Mai 1913] (Br), s.n. [Bokala, Mai 1915] (Br); Pittery 822 (Br); Pynaert 256 (Br), 919 (Br), 1082 (Br), 1500 (Br), s.n. [1907] (Br); Roucou s.n. [1-4-1913] (Br); Sapin s.n. [Gombé, 1912] (Br); Seret 142 (Br); Thonner 234 (Br); Tidao s.n. [Jct. of Ubangi & Congo rivers, Dec. 1916] (Ca--54394); Vanderyst 613 (Br), 1207 (Br), 1271 (Br), 1352 (Br), 1589 (Br), 1687 (Br), 3642 (Br), 4080 (Br), 17403 (Br), 21131 (Br), 22105 (Br), 22166 (Br), 22843 (Br), 22969 (Br), 23123 (Br), 23998 (Br, Br), 29412 (Br), 29512 (Br), 30958 (Br, Br, Br), 32105 (Br), 32178 (Br, Br), 32179 (Br, Br), 32280 (Br), 33212 (Br), 34106 (Br), B.106 (Br), s.n. [1907] (Br), s.n. [Mai 1908] (Br), s.n. [11/1910] (Br), s.n. [Leopoldville, 1910] (Br), s.n. [14 avril 1911] (Br), s.n. [27 avril 1911] (Br), s.n. [22 juin 1911] (Br), s.n. [Wombali, 11/1911] (Br); Vanderyst & Lambrette 5577 (Br); Vermoesen 2027 (Br), 2028 (Br); Verschueren 458 (Br), 601 (Br), 633 (Br), 753 (Br), 865 (Br); Wilwerth s.n. [Upoto, 1896] (Br). CULTIVATED: Congo Leopoldville: De Giorgi 974 (Br); Jespersen 13 (Br), 14 (Br); Vanderyst 20934 (Br), 31735 (Br), 31743 (Br).

LIPPIA MULTIFLORA var. PUBESCENS Moldenke, Phytologia 3: 271.1950.

Bibliography: Moldenke, Phytologia 3: 271. 1950; Moldenke, R&-

sumé 138 & 462. 1959.

This variety differs from the typical form of the species in having its stems and branches, as well as the petioles and pedunncles, densely strigose-pubescent, and its leaf-blades more or less scabrous-pilose above and densely short-pilose beneath.

The type of the variety was collected by H. V. Lely (no. 241) at Naraguta, at an altitude of 4000 feet, Northern Nigeria, on May 30, 1921, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. Its pubescence renders this variety very distinct. It is said to grow 18 to 24 inches tall and to have hard heads of purplish flowers. Thus far it is known only from the type collection. In all, 2 herbarium specimens and 4 mounted photographs have been examined by me.

Citations: NIGERIA: Northern: Lely 241 (F--photo of type, K--type, N--photo of type, N--isotype, Sg--photo of type, Z--photo of type).

LIPPIA MYRIOCEPHALA Schlecht. & Cham., Linnaea 5: 98. 1830.

Synonymy: Lippia myriocephala Cham. & Schlecht. ex Gandoger, Bull. Soc. Bot. France 65: 53 [as "myriocephalae"]. 1918. Lippia lancifolia Sessé & Moc. ex Moldenke, Prelim. Alph. List Invalid Names 31, in syn. 1940. Lippia mycrocephala Schlecht., in herb.

Bibliography: Schlecht. & Cham., Linnaea 5: 98. 1830; Steud., Nom. Bot., ed. 2, 2: 54. 1840; Walp., Repert. Bot. Syst. 4: 52—53. 1845; Benth., Bot. Voy. Sulphur 154. 1846; Schau. in A. DC., Prodr. 11: 580. 1847; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Loes., Verh. Bor. Ver. Brand. 53: 77 [Abhandl. 242]. 1912; Gandoger, Bull. Soc. Bot. France 65: 63. 1918; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1244 & 1247. 1924; A. B. Seymour, Host Ind. Fungi N. Am. 588. 1929; C. L. Lundell, Carnegie Inst. Wash. Publ. 478: 45, 75, 135, 137, 183, 194, & 203. 1937; P. C. Standl., Field Mus. Publ. Bot. 18: 1009 & 1010. 1938; Moldenke, Alph. List Common Names 29 & 32. 1939; Moldenke, Prelim. Alph. List Invalid Names 31. 1940; Moldenke, Carnegie Inst. Wash. Publ. 522: 169. 1940; Calderón & Standl., Fl. Salvador., ed. 2, 238. 1941; C. L. Lundell, Contrib. Univ. Mich. Herb. 8: 61. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20, 21, & 96. 1942; Moldenke, Alph. List Invalid Names 31. 1942; Moldenke, Phytologia 2: 107. 1945; Moldenke, Alph. List Cit. 1: 53 & 54. 1946; Moldenke, Alph. List Invalid Names 14. 1947; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 43. 1947; Moldenke, Alph. List Cit. 2: 351, 536, 554, & 588 (1948), 3: 663, 714, 715, 754, 755, 891, 926, 948, 958, 961, & 973 (1949), and 4: 1013, 1095, 1097, & 1295; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35, 37, 38, & 190. 1949; Matuda, Am. Midl. Nat. 44: 576. 1950; Calpouzos, Econom. Bot. 8: 228. 1954; Moldenke, Résumé 37, 42, 44, 45, 313, 315, & 462. 1959; Moldenke, Résumé Suppl. 1: 3 (1959) and 2: 4. 1960; Moldenke, Phytologia 12: 24, 115, 142, 189, 215, & 216. 1965.

Shrub or tree, to 12 m. tall; crown spreading; branches tet-

ragonal, pubescent; leaves decussate-opposite, very pubescent when young or only the youngest pubescent beneath, the lower ones largest; petioles short; leaf-blades membranous, dull-green above, paler beneath, lanceolate or elliptic-lanceolate to lanceolate-oblong, 6—18 cm. long, about 5 cm. wide, usually long-acuminate at the apex, acute to attenuate at the base, finely or obsoletely serrate along the margins, scabridous-hirtellous to scaberulous or glabrescent and smooth above, sparsely and rather softly puberulent or glabrate beneath, sometimes tomentose or puberulent-hirtellous on the venation only, penninerved; midrib and secondaries somewhat impressed above, prominent beneath; peduncles slender or filiform, long, about half as long as the subtending leaves; heads usually numerous (about 5) at each node, fasciculate, globose or somewhat elongate, 5--7 mm. in diameter; bractlets not at all or scarcely accrescent in age, ovate, acuminate or acute at the apex, patulous, puberulent; corolla hypocrateriform, dull-yellowish or greenish-yellow to white or lilac.

The type of this species was collected by Christian Julius Wilhelm Schiede and Ferdinand Deppe in the woods about Jalapa, Vera Cruz, Mexico. The species is no. 133 in Schlechtendal and Chamisso's enumeration, and these authors describe the flower heads as being about the size of a grain of pepper (Piper nigrum).

Schauer (1847) classifies the species in his Section Dipterocalyx. It has been found on open hillsides, at the edge of rivers, in thickets or rocky thickets, damp or dry thickets, forests and open forests, pine-oak forests, canyons, and pine and oak regions near rivers, at altitudes of 350 to 3000 meters, flowering from October to April, July, and September, and fruiting from December to April and July. Allen refers to it as "very common, forming almost pure stands in some places" in El Salvador; Standley calls it "common" in Guatemala; and Standley & Calderón call it "scarce" in Honduras. Standley states that it produces good wood for houses and other uses in El Salvador. The flowers are described as "greenish-yellow" on P. H. Allen 7224 and as "dull-yellowish" on P. C. Standley 29628.

Vernacular names applied to this plant are "carbonero", "macahuite", "oreganillo", "salvia", "tamayagua", "tatascame", and "vera blanca". It should be noted that "oreganillo" is applied also to L. cardiostegia Benth., L. graveolens H.B.K., and L. umbellata Cav.

Gandoger (1918) cites Ehrenberg 1202 as typical of L. myriocephala and compares his L. melastomifolia with it, which see. Lippia myriocephala is attacked by the fungi Bullaria elatipes (Arth. & Holw.) Arth. & Mains, Puccinia elatipes Arth. & Holw., Prospodium lippiae (Speg.) Arth., Puccinia lippiae Speg., Uredo lippiae Speg., Micropuccinia permagna (Arth. & Holw.) Arth. & Jacks., Puccinia permagna Arth. & Holw., and P. senilis Arth.

Material of this species has been misidentified and distributed in herbaria as Baccharis sp. On the other hand, the Tucker 793 and

Türckheim II.1474, distributed as L. myriocephala, are actually var. integrifolia Loes.; H. Pittier 7519, Herb. Inst. Physico-geogr. Nat. Costaric. 13215, Stork & Horton 8646, and Tonduz 1460 are L. cardiostegia Benth.; Echeverria 6, Skutch 2292, and Tonduz 1262 are L. costaricensis Moldenke; Aguilar Hidalgo 394, H. H. Bartlett 13008, M. C. Carlson 430 & 431, Dressler & Jones 190, Herb. Mus. Yale School Forest. 10041, Kenoyer s.n. [Valles, 9-3-38], C. L. Lundell 2780 & 3171, Pringle 3277 & 11668, Purpus 2254, 5751, 8648, & 11668, Record & Kuylen G.90, W. Schaffner 1, and C. L. Smith 1076 are all L. hypoleia Briq.; and the Calvert & Calvert s.n. from Costa Rica is not verbenaceous. Standley (1938) says: "A good many Costa Rican collections have been referred to this Mexican species, but I have seen only two that seemed properly referable here, and these I am unable to distinguish from the typical form. It may be, however, that careful study will show that the collections I have placed here are properly referable elsewhere." The L. myriocephala of Lundell (1937) is L. hypoleia.

It is actually probable that L. hypoleia should be regarded as nothing more than a variety of L. myriocephala.

In the Harvard University herbaria the following specimens are also filed under L. myriocephala, but have not as yet been verified by me: MEXICO: Chiapas: E. W. Nelson 3075 (G). Oaxaca: L. C. Smith 598 (G). San Luis Potosí: Seler & Seler 743 (G). Vera Cruz: Seler & Seler 3649 (G). GUATEMALA: El Progreso: Steyermark 42988 (A). HONDURAS: Morazan: L. O. Williams 17403 (G); Williams & Molina R. 13710 (G). Tegucigalpa: J. B. Edwards P.1 (G, also wood collection). EL SALVADOR: Cuscatlan: Calderón 1995 (G). NICARAGUA: Grenada: Ørsted 11223 (A). COSTA RICA: Cartago: Dodge & Thomas 4519 (G). San José: Holway 404 (G); H. Pittier 7111 [Herb. Nat. Costaric. 8452] (G). The last two mentioned are certainly not this species.

In all, 55 herbarium specimens, including the type of one of the names involved, have been examined by me.

Citations: MEXICO: Chiapas: Matuda 610 (Mh, Mi), 707 (Mh, Mi, N, N), 849 (Mh, Mi, N, N), 3642 (A, N), S.67 (A, Mi, N, N, N). Tabasco: Linden 530 (Br); J. N. Rovirosa 286 (Pa). Vera Cruz: Galeotti 775 (Br, Br); F. W. Johnson s.n. [Sept. 22, 1906] (N); Langman 3654 (W—1976428); F. Müller 276 (M), s.n. [Orizaba, 1855] (M); Purpus 8707 (Ca—2084461); Sallé s.n. [Orizaba] (Cb). State undetermined: Botteri s.n. [1856] (Cb); Quarles van Ufford 123 [Finca S. Antonio] (Ut); Sessé, Mociño, Castillo, & Maldonado 2222 (Q). GUATEMALA: Alta Verapaz: Türckheim 7933 (A, C, G). Baja Verapaz: P. C. Standley 91087 (N). Quezaltenango: P. C. Standley 68071 (N), 87087 (N). Sacatepéquez: J. D. Smith 1450 (G); P. C. Standley 63275 (A, N), 65031 (A, N). San Marcos: Steyermark

36327 (F--1033912). Santa Rosa: Heyde & Lux 4386 (C, G), 4388 (C, G). HONDURAS: Comayagua: Standley & Chacón P.6832 (N). Tegucigalpa: Von Hagen & Von Hagen 1225 (N). EL SALVADOR: San Salvador: P. C. Standley 20628 (G, N). San Vicente: P. C. Standley 21536 (G, N). Sonsonate: P. H. Allen 7224 (G, N, Rf).

LIPPIA MYRIOCEPHALA var. INTEGRIFOLIA Loes., Verh. Bot. Ver. Brand. 53: 77 [Abhandl. 242]. 1912.

Bibliography: Loes., Verh. Bot. Ver. Brand. 53: 77 [Abhandl. 242]. 1912; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 20 & 96 (1942) and [ed. 2], 35 & 190. 1949; Moldenke, Alph. List Cit. 3: 919, 961, 962, & 973 (1949) and 4: 1012 & 1013. 1949; Moldenke, Résumé 42 & 462. 1959; Moldenke, Résumé Suppl. 3: 11. 1962.

This variety differs from the typical form of the species in having entire leaf-blades. It is described by collectors as a shrub or small tree, to 10 m. tall, spreading; leaf-blades firmly membranous, dark- or deep-green above, dull-green or grayish beneath; corolla whitish, white with a yellow throat, or white with lilac at the tip.

The variety was based by Loesener on a collection made by Hans von Türckheim (no. 1088) at Coban, at an altitude of 4300 feet, Alta Verapaz, Guatemala, in November, 1886, and on two collections made by Caecilia and Georg Eduard Seler (nos. 2485 & 3400) at the same locality, the former collected on December 6, 1896, and the latter collected on a wooded hillside on December 23, 1896.

The variety has been found on dry rocky hills and wooded hillsides, in wooded quebradas, oak forests and pine-oak forests, at altitudes of 300 to 2000 meters, flowering from November to January and March, fruiting in December and March. The flowers are described as "white with lilac at tip" on Steyermark 33152, as "whitish" on Steyermark 44874, and as "white, throat yellow inside" on Tucker 793. Standley describes the plant as "common" in Baja Verapaz.

In all, 16 herbarium specimens, including type material, and 7 mounted photographs have been examined by me.

Citations: GUATEMALA: Alta Verapaz: Seler & Seler 2485 (G--cotype, N--photo of cotype, Z--photo of cotype), 3400 (G--cotype, Gg--245894--cotype, N--cotype, N--photo of cotype, Z--photo of cotype); Steyermark 44874 (N); Türckheim 1088 (G--cotype, N--cotype, N--photo of cotype, S--photo of cotype, Z--photo of cotype), II. 1474 (Br, Br, I, Mi). Baja Verapaz: P. C. Standley 69693 (N). Sacatepéquez: P. C. Standley 80854 (N), 88967 (N). Santa Rosa: Steyermark 33152 (F--1034000). EL SALVADOR: Morazán: Tucker 793 (Ca--903).

LIPPIA NANA Schau. in A. DC., Prodr. 11: 582. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 582. 1847; Schau. in Mart., Fl. Bras. 9: 235. 1851; Jacks. in Hook. f. & Jacks., Ind.

Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Phytologia 2: 385. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80 & 190. 1949; Moldenke, Alph. List Cit. 3: 695 & 847. 1949; Moldenke, Phytologia 4: 70. 1952; Moldenke, Résumé 94 & 462. 1959; Moldenke, Phytologia 12: 24. 1965.

Perennial plant, with a creeping woody rhizome; stems erect, herbaceous, 5--10 cm. tall, viscid-pubescent; leaves decussate-opposite, remote, sessile, the upper ones lanceolate, about 5 cm. long, about 1.4 cm. wide, acute at the apex, entire and cuneate at the base, crenate-serrate toward the apex, 3-plinerved, sub-glabrous on the lamina, strigose-puberulent on the venation, the midrib pinnately branched, decreasing in size toward the base of the stems, the lowest scale-like but still floriferous in their axils; peduncles filiform, equaling or surpassing the internodes, issuing even from the lowest leaf-axils, viscid-pubescent; heads globose, many-flowered, 8--10 mm. in diameter; exterior bractlets involucrate, ovate, the interior ones oblong, somewhat larger, equaling the corolla-tube, subacute at the apex, all viscid-pubescent and ciliate; flowers rather large; calyx membranous, very short, scarcely 4-dentate or even diphyllous, pubescent, very shortly ciliate; corolla hypocrateriform, its tube straight, 4 mm. long, slightly ampliate and puberulent at the throat, the limb 4-fid, the lateral lobes rounded, the upper smaller, the lower larger, subretuse; style half as long as the corolla-tube, smooth, subacute; stigma unilateral at the apex, punctiform; o-vary glabrous.

The type of this most distinct species was collected by Johann Emanuel Pohl (no. 6063) in the Serra Urubu, Goiás, Brazil, and is deposited in the herbarium of the Naturhistorisches Museum in Vienna, where it was photographed by Macbride as his type photo-graph number 34331.

The species was placed by Schauer (1847) in his Section Zapania, Subsection Axilliflorae. It has been collected in flower in July and September. In many respects it resembles one of the diminu-tive species of Lantana, like L. glaziovii Moldenke. Macedo says of it "plantinha campestre, amarelas".

In all, 3 herbarium specimens and 7 mounted photographs, inclu-ding phototype material, have been examined by me.

Citations: BRAZIL: Goiás: Macedo 3251 (N); J. E. Pohl 6063 [Macbride photos 34331] (It--photo of type, Kr--photo of type, N--photo of type). Minas Gerais: Regnell III.948 (F--photo, N, N--photo, S, Si--photo, Z--photo).

LIPPIA NIGERIENSIS Moldenke, Phytologia 3: 272. 1950.

Bibliography: Moldenke, Phytologia 3: 272. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Phytologia 5: 97. 1954; Moldenke, Résumé 137, 138, 426, & 462. 1959; Moldenke, Résumé Suppl. 1: 10. 1959; Moldenke, Phytologia 12: 42. 1965.

Annual or perennial herb, to 2 m. tall, or erect subshrub, many-headed; stems annual, apparently simple, obtusely tetragonal, the

sides sulcate, densely short-pubescent with irregularly twisted rather spreading whitish hairs; twigs bright-brown; nodes rather indistinctly annulate; principal internodes 5--11 cm. long; leaves ternate, ascending; petioles 1 cm. long or less, densely white-pubescent with more or less antrorse hairs; leaf-blades firmly chartaceous, pale rather glaucous-green on both surfaces, oblong-elliptic, 4.5--9.5 cm. long, 1--2 cm. wide, acute or subacute at the apex, rather regularly serrate with bluntish teeth except at the base, stiffly asperulous or scabrous and strigillose-pilose above, densely canescent-tomentellous beneath; midrib slender, impressed above, prominent beneath; secondaries very slender, 10--12 per side, arcuate-ascending, arcuately joined near the margins, not extending into the teeth, impressed above, prominulous beneath; veinlet reticulation abundant, subimpressed above, prominulous but usually hidden by the tomentum beneath; inflorescence axillary and terminal, the axillary ones usually limited to a pair in the upper 1 or 2 groups of leaf-axils, the terminal ones aggregated into a more or less flattened corymb of which most of the rays are compound (branched to form a small umbel of heads at the apex); primary and secondary peduncles densely canescent-pubescent with more or less antrorse hairs; bracts limited to 1 or 2 groups of 3 each beneath and in the terminal corymb; spikes capitate or to about 1 cm. long, densely many-flowered; bractlets ovate, about 4 mm. long and 2 mm. wide, acuminate or subacuminate at the apex, very densely villous with canescent or slightly yellowish hairs; corolla white or white with a yellow eye, its tube about 3 mm. long, densely tomentellous on the outside except at the very base, the larger lip and additional 1 mm. long, tomentellous on the outer surface, glabrate within.

The type of this distinct species was collected by W. D. Mac Gregor (no. 429) on the Banchi Plateau, Northern Nigeria, on December 28, 1928, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The species has been found in dry grassland by roadsides, flowering in June and December. Gossweiler notes "not frequent in Hyparrhenietum" in Angola. The flowers are described as "white" on Gossweiler 11070 and as "white with a yellow eye" on Meikle 1059. Material has been misidentified and distributed in herbaria under the name L. adoensis Hochst.

In all, 6 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: NIGERIA: Northern: Lely 115 (K); W. D. MacGregor 429 (F--photo of type, K--type, N--photo of type, N--isotype, Sg--photo of type, Z--photo of type); Meikle 1059 (S). ANGOLA: Lunda: Gossweiler 11070 (B, W--20744432).

LIPPIA NIGERIENSIS var. BREVIPEDUNCULATA Moldenke, Phytologia 3: 272--273. 1950.

Bibliography: Moldenke, Phytologia 3: 272--273 (1950) and 3: 455 & 456. 1951; Moldenke, Résumé 138, 142, & 462. 1959.

This variety differs from the typical form of the species in having its leaves regularly in whorls of 4--6, only 3--4.5 cm.

long and 4--11 mm. wide, and bullate above, and the inflorescences unbranched and only 1.5--3 cm. long in all.

The type of the variety was collected by H. V. Lely (no. P.40) in groups after fires at Banchi, Northern Nigeria, in January, 1929, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The plant is described as an aromatic herb or small shrub, 2 m. tall, with white or lemon-yellow flowers, known locally as "okwamgo" in the Congo, growing on riverbanks at 1875 meters altitude, flowering in January, May, and July. The Pritchard collection is said to have had the "lemon-yellow" flowers, while the Henriques and the Barbosa & Moreno collections had them "white".

Herbarium material has been misidentified and distributed in herbaria as L. scaberrima Sond.

In all, 6 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: NIGERIA: Northern: Lely P.40 (F--photo of type, K--type, N--photo of type, N--isotype, Sg--photo of type, Z--photo of type). CONGO LEOPOLDVILLE: Kevers 48 (Br). ANGOLA: Huíla: Barbosa & Moreno 10167 (Ul); C. Henriques 49 (Ul); N. M. Pritchard 306 (Ul).

LIPPIA OATESII Rolfe in Oates, Matabeleland, ed. 2, 407. 1889.

Bibliography: Rolfe in Oates, Matabeleland, ed. 2, 407. 1889; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 279. 1900; Prain, Ind. Kew. Suppl. 4: 142. 1913; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 51 & 96. 1942; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 48. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 74. 1948; Moldenke, Phytologia 3: 77, 137, & 138. 1949; Moldenke, Alph. List Cit. 4: 1099. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 119 & 190. 1949; Moldenke, Résumé 147, 149, & 462. 1959; Moldenke, Phytologia 12: 42, 106, 230, & 232. 1965.

Perennial aromatic herb, undershrub, or shrub, to 1.1 m. tall, strongly scented, many-headed, with an underground rootstock; branchlets slender, woody, with very short whitish pubescence; leaves ternate, subsessile, oblong, subcoriaceous, 2.5—4 cm. long, obscurely crenate along the margins, rather rugose, subscabrous above, pubescent, with elevated veins beneath; heads globose, 1.3 cm. in diameter, borne in 4's on short peduncles in the upper leaf-axils; bractlets orbicular, very hairy, not cuspidate, the outer ones 4 mm. wide; flowers with the odor of Aloysia triphylla, not longer than the subtending bractlets; corolla hypocrateriform, yellow or yellowish-white to white.

The type of this distinct species was collected by Frank Oates — in whose honor it was named -- in Matabeleland, Southern Rhodesia, in about 1874. In a letter to me dated February 19, 1949, Dr. H. Wild says that "Oates never crossed the Zambesi and so never entered Northern Rhodesia". The species has been found in park-like veld, damp grass veld, Acacia veld, and on gray loam soil, at 1000 meters altitude, flowering in October, December, and February. Penny says it is "not particular as to surroundings"

Eyles says that it is "used to repel mosquitoes", while Hopkins reports that it "keeps away snakes". A common name for it is "um susani". The flowers are described as "pale yellow" on R. M. Davies 52, as "yellowish-white" on Kolbe 3169, and as "white" on J. C. F. Hopkins s.n. [21.2.1941].

Baker (1900) separates the 8 tropical African species of Lippia known to him as follows:

1. Bractlets orbicular, obtuse at the apex.
  2. Peduncles very short,.....L. oatesii.
  2a. Peduncles elongate.....L. radula.

1a. Bractlets cuspidate at the apex.
  3. Leaves small.
    4. Leaves orbicular or obovate.....L. somalensis.
    4a. Leaves oblong, rugose.....L. javanica.
  3a. Leaves larger, oblong or oblanceolate-oblong, scarcely rugose.....L. abyssinica.

1b. Bractlets acuminate at the apex.
  5. Leaves decussate-opposite.....L. ukambensis.
  5a. Leaves ternate.....L. burtonii.

1c. Bractlets acute at the apex.....L. plicata.

The A. Peter 46707 distributed as L. oatesii is actually L. javanica (Burm. f.) Spreng., while Borle 306 is L. whytei Moldenke. Baker (1900) cites a Baines s.n. [South African Gold Fields] from Northern Rhodesia.

In all, 18 herbarium specimens and 2 mounted photographs have been examined by me.

Citations: SOUTHERN RHODESIA: J. Borle 77 (S); R. M. Davies 52 (Rh--23304), 128 (Rh--23302); Haptrom & Acock 1322 (N, S, S); J. C. F. Hopkins s.n. [Govt. Herb. S. Rhodesia 10231] (N), s.n. [Feb. 1939] (N, Rh--7776), s.n. [21.2.1941] (Rh--7975); Kolbe 3169 (K); Penny 1 (Rh--5709); Stent s.n. [14.4.31] (Rh--3966); E. Wall 10, in part (Go, N, N--photo, Z--photo), s.n. [15/10/1938] (S); O. West 2679 (Rh--25645). ANGOLA: Gossweiler 9364 (K).

LIPPIA OAXACANA Robinson & Greenm., Am. Journ. Sci. 150 [ser. 3, 50]: 162. 1895.

Bibliography: Robinson & Greenm., Am. Journ. Sci. 150 [ser. 3, 50]: 162. 1895; Greenm., Proc. Am. Acad. Sci. 39: 87. 1903; Durand & Jacks., Ind. Kew. Suppl. 1: 250. 1903; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1244 & 1246. 1924; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 96. 1942; Moldenke, Alph. List Cit. 2: 393 & 467 (1948), 3: 830 & 834 (1949), and 4: 1182. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31 & 190. 1949; Moldenke, Résumé 37 & 462. 1959; Moldenke, Résumé Suppl. 3: 9. 1962; Moldenke, Phytologia 12: 133. 1965.

A shrub, to 1.5 m. tall; stems cinereous, subterete, smoothish; branchlets canescent-tomentose; leaves decussate-opposite, short-

petiolate; leaf-blades ovate-oblong, 2--3.6 cm. long, 1—1.8 cm. wide, acute or obtuse at the apex, cremulate-serrulate along the margins, obtuse or rounded at the base, rugose and densely pubescent above, paler and tomentose beneath; inflorescence terminal on the branches, rather dense and spike-like, 5 cm. long, almost 2.5 cm. wide, somewhat looser and rarely branched below; bractlets rhombic-obovate, yellowish-green, 8 mm. long, 4 mm. wide, abruptly acuminate at the apex, pubescent on the outer surface, ciliate along the margins, 1-flowered; flowers about 4.5 mm. long; calyx 2-lobed, densely pilose-pubescent; corolla hypocrateriform, cream-colored, about 3 mm. long, 4-lobed, sparingly pubescent on the outside; fruit pyriform.

The type of this distinct species was collected by Cyrus Guernsey Pringle (no. 6021) on dry limestone hills in Las Hoyas Canyon, at an altitude of 5000 feet, Oaxaca, Mexico, on November 1, 1894. The original description cites also E. W. Nelson 1586 & 1841 from six miles above Dominguillo, at an altitude of 5000 to 6000 feet, collected on October 3, 1894, but annotations on the original specimens seem to indicate that the authors regarded the Pringle collection as the actual type. Only its printed labels are inscribed "n. sp." after the binomial.

The species has been collected on limestone mountains and dry limestone hills, at altitudes of 1350 to 1750 meters, flowering from July to September and in November, fruiting in July, August, and November. McVaugh reports it "occasional in wooded ravines and shrub-covered hills with Acacia, Mimosa, Eysenhardtia, and Forestiera".

In all, 36 herbarium specimens, including type material, and 4 mounted photographs have been examined by me.

Citations: MEXICO: Guerrero: Bravo Hollis 7145 (Me, Me, Me, Me); Pringle 8417 (Ca--104939, Cm, G, Io—38728, It, Me, Me, Me, Mi, N, Po--64108, S, Vt). Jalisco: R. McVaugh 17639 (Mi). Oaxaca: E. W. Nelson 1586 (G), 1841 (G); Pringle 6021 (Br—isotype, C--isotype, Ca--104938--isotype, Cm--isotype, F—photo of isotype, G--isotype, Io—38729--isotype, Me—isotype, Me--isotype, Me—isotype, N--photo of isotype, S--isotype, Si--photo of isotype, Vt—isotype, Z--photo of isotype). Puebla: Purpus 2571 (Ca--139671, G, Mi, N), 3925 (Ca--139670).

LIPPIA OBOVATA Sessé & Moc., Fl. Mex., ed. 2, 140. 1894.

Bibliography: Sessé & Moc., Fl. Mex., ed. 2, 140. 1894; A. W. Hill, Ind. Kew. Suppl. 7: 139. 1929; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 96 (1942) and [ed. 2], 31 & 190. 1949; Moldenke, Résumé 37 & 462. 1959.

Shrub, 1.8 m. tall; branches slender, erect, obsoletely 4-angled, striate; leaves decussate-opposite, very short-petiolate; leaf-blades obovate, serrate along the margins, obliquely striate, subvillous; inflorescence axillary, pedunculate, somewhat surpassing the subtending leaves; heads or spikes oblong; bractlets imbricate, ovate; corolla pinkish-white.

Nothing is known to me of this plant except what is stated in the original description, where the above-mentioned characters are listed and it is further stated "Reliqua ut in charactere. Floret Maio. ♄. Proprietas. Tota planta, folia precipue et capitula origanum redolent; unde nomen ab indigenis inditum, qui ad condimenta origani loco eduntur."

LIPPIA OBSCURA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1155--1156. 1904.

Synonymy: Lantana obscura Briq. ex Moldenke, Alph. List Invalid Names Suppl. 1: 12, in syn. 1947.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1155--1156. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 491. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 41, & 96. 1942; Moldenke, Lilloa 8: 424. 1942; Moldenke, Alph. List Cit. 1: 121, 171, & 264. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 12. 1947; Moldenke, Lilloa 14: 44. 1948; Moldenke, Castanea 13: 117. 1948; Moldenke, Alph. List Cit. 2: 553 (1948), 3: 689, 704, & 705 (1949), and 4: 1165, 1250, & 1251. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 99, & 190. 1949; Stellfeld, Trib. Farmac. 19 (10): 169. 1951; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 349. 1951; Angely, Fl. Paran. 7: 12. 1957; Moldenke, Résumé 94, 117, 306, & 462. 1959; Angely, Fl. Paran. 16: 60 (1960) and 17: 46. 1961; Troncoso, Darwiniana 12: 257 & 260--261, fig. 1. 1961; Moldenke, Phytologia 12: 24, 26, 47, & 170. 1965.

Illustrations: Troncoso, Darwiniana 12: 261, fig. 1. 1961.

Shrub, often arborescent, to 3 m. tall, sparsely branched; branches divergent, obtusely tetragonal, ferruginous-pubescent throughout with short antrorse hairs; middle internodes 2--8 cm. long; leaves decussate-opposite; petioles to 1.5 cm. long, canescent, tomentose-pubescent; leaf-blades ovate-elliptic or ovate-oblong, about 8 cm. long and 3.5 cm. wide, obtuse at the apex, more convex along the margins below the middle, rounded-subcordate at the base, rather thick-textured, rugose and green above and short-puberulent, paler and densely short-tomentose-pubescent beneath, the marginal teeth small and regular, the venation densely reticulate, areolate on the upper surface, prominent beneath; peduncles slender, about 1 cm. long, scarcely equaling or equaling the petiole, canescent-pubescent throughout with short antrorse hairs; heads small, globose-subcylindric, 8--10 per leaf-axil, about 5 mm. long and wide; bractlets imbricate, ovate, 2--2.5 mm. long, about 2 mm. wide, connate at the base, complicate, acute at the apex, short-pubescent on the back, densely white-pubescent on the margins; flowers fragrant; calyx minute, campanulate, about 1 mm. long, pubescent on the outside, obscurely sub-bilabiate, the margin repandly 4-denticulate; corolla hypocrateriform, small, white or cream-white to yellowish-white, puberulent above, the tube cylindric, exserted about 2 mm. from the calyx, the lobes rounded, small, the anterior one smaller, about 0.5 mm. long; stamens and pistil normal for the genus, included.

The type of this species was collected by Emil Hassler (no. 8016) in woods in the region of the upper course of the Río Apa, Paraguay, in 1901 or 1902, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17529, but is now destroyed. Troncoso (1961) regards the specimen in the Delessert Herbarium at Geneva as the type. She classifies the species in her Subgenus Lippia, Section Goniostachyum. She cites the following specimens not as yet seen by me: BRAZIL: Paraná: Dusén 9219 (K). PARAGUAY: Hassler 8016 (Bm--isotype, Cb--isotype, K--isotype, Ml--isotype, P--isotype). She comments that "Lippia obscura presenta gran afinidad con varias especies brasileñas de la misma sección Goniostachyum: L. salviaefolia Cham., L. velutina Schauer, L. rubiginosa Schauer, L. origanoides Kth. Solamente un minucioso estudio comparativo con los tipos de esta especies, difíciles de diferenciar por sus descriptiones, permitirá establecer su verdadero valor específico."

Briquet (1904) says "Cette espèce est voisine du L. polycephala var. Aemillii à laquelle elle ressemble par la forme des feuilles, mais elle s'en distingue par ses pédoncules atteignant à peu près les pétioles, à capitules longuement dépassés par les feuilles; les capitules eux-mêmes sont moins nombreux, plus courts, à corolles plus petites, ne jaunissant pas la desiccation. Comme apparence générale, la L. obscura rapelle beaucoup le L. graveolens Kunth, espèce mexicaine. -- La ressemblance est également fort étroite avec le L. origanoides Kunth, du moins avec les échantillons du Brésil (Blanchet n. 3886) que Schauer rapporte au L. origanoides, car nous n'avons pas vu le type vénézuélien de Kunth, et il n'est pas absolument certain que le rapprochement fait par Schauer soit fondé. La type de Blanchet en diffère cependant par ses feuilles plus petites, les pédoncules plus longs que les pétioles assez courts et des capitules à bractées oblongues acuminées, plus allongées, blanches, soyeuses extérieurement."

The plant has been found by collectors in cerrados along roadsides, in fields and campos, on campo cerrado, and in mountains, flowering from November to May, at altitudes of 720 to 730 meters. The flowers are described as "white" on Hassler 8016 and Malme 1482 & 3121, as "cream-white" on Com. Rondon 2817 & 2819, and as "yellowish-white" on Com. Rondon 1778 & 1780. Material has been misidentified and distributed in herbaria as L. martiana Schau.

In all, 30 herbarium specimens, including type material of both names involved, and 5 mounted photographs have been examined by me.

Citations: BRAZIL: Matto Grosso: F. C. Hoehne Com. Rondon 1778 (Sp--31992), 1780 (N), 2817 (N), 2819 (N, Sp--31991); Malme 1482 (N, S, S), 3121 (N, S). Paraná: Dusén 9219 (I, Mi, N, S), 14929 (Ca--501875, N, N, S), 16591 (N, S), s.n. [Morungava, 1914--16] (N, S); Hatschbach 3751 (Z), 6901 (Bm). PARAGUAY: Anisits 230 (N,

S); Hassler 8016 [Macbride photos 17529] (Ca--944345--isotype, It--photo of type, Kr--photo of type, N--isotype, N--isotype, N--photo of type, N--photo of type, S--isotype, W--photo of type).

LIPPIA ORIGANOIDES H.B.K., Nov. Gen. & Sp. Pl. 2: 267. 1818 [not L. origanoides Schau., 1904].

Synonymy: Lippia berterii Spreng. in L., Syst. Veg., ed. 16, 2: 752. 1825. Lippia origanoides Humb. ex Spreng. in L., Syst. Veg., ed. 16, 2: 752. 1825. Lippia origanoides Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 54. 1840. Lippia origanoides Humb. & Kunth ex D. Dietr., Syn. Pl. 3: 599. 1843. Lippia origanoides Kunth ex Schau. in A. DC., Prodr. 11: 575. 1847. Lippia origanioides Just, Bot. Jahresber. 23 (2): 566. 1897. Lippia origanodes H.B.K. ex Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898. Lippia originoides H.B.K. ex Moldenke, Résumé 316, in syn. 1959.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl. 2: 267. 1818; Spreng. in L., Syst. Veg., ed. 16, 2: 752. 1825; Steud., Nom. Bot., ed. 2, 1: 664 (1840) and 2: 54. 1840; D. Dietr., Syn. Pl. 3: 599. 1843; Walp., Repert. Bot. Syst. 4: 50. 1845; Schau. in A. DC., Prodr. 11: 575 & 593. 1847; Schau. in Mart., Fl. Bras. 9: 224. 1851; Bocq., Adansonia 3: 244. 1863; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Just, Bot. Jahresber. 23 (2): 76 & 566. 1897; Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1156. 1904; Hayek, Denkschr. Kaiser. Akad. Wissensch. Math.-nat. 79 (1): 295. 1908; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 540. 1911; H. H. Rusby, Bull. N. Y. Bot. Gard. 8: 116. 1912; M. Martínez, Cat. Nomb. Vulg. & Cientif. Pl. Mex., [ed. 2], 340. 1937; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31, 32, 37, 40, 73, 95, & 96. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 54. 1942; Moldenke, Bot. Gaz. 106: 162. 1944; Moldenke, Phytologia 2: 81, 82, & 107. 1945; Moldenke, Alph. List Cit. 1: 40, 45, 89, 97, 106, 107, 121, 137, 212, 221, 231, & 266. 1946; Moldenke, Lilloa 12: 148. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 13. 1947; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 45, 46, & 51. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 50. 1948; Moldenke, Alph. List Cit. 2: 352, 369, 446, 448, 485, 573, 610, 628, & 643 (1948), 3: 689, 696, 782, 819, 820, 887, 891, 947, 955, 974, & 975 (1949), and 4: 984, 1006, 1014, 1070, 1075, 1079, 1080, 1175, & 1216. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 60, 63, 162, & 190. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Phytologia 3: 133 (1949) and 3: 375. 1950; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 289. 1950; Moldenke, Phytologia 3: 485. 1951; Calpouzos, Econom. Bot. 8: 228. 1954; Moldenke in Steyermark & al., Fieldiana 28: 1082. 1957; Moldenke, Résumé 67, 71, 94, 220, 311, 316, & 462. 1959; Troncoso, Darwiniana 12: 260. 1961; Tamayo, Bol. Soc. Venez. Cienc. Nat. 22: 128 & 173. 1961; Moldenke, Résumé Suppl. 7: 4 (1963), 8: 5 (1964), 10: 4 (1964), and 11: 7. 1964; Moldenke,

Phytologia 12: 23, 47, 56, 63, 152, 162, 164, 170, & 188—190. 1965.

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## BOOK REVIEW

Alma L. Moldenke

"Caribbean Gardening —with special reference to Jamaica", by Aimee Webster (F. R. H. S.), viii + 138 + xxl pp., illustr. William Cleves & Sons, London, England. U. S. A. distributor: Edwin A. Menninger, Stuart, Florida. 1964. $2.80

The following quote from the reverse side of the title page gives a good survey of the book and a glowing feeling for the subject matter that motivates the author. "Cascading colours of mammoth flowers with powerful fragrances.....lushly variegated leaves.....climatic extremes from arid coast to rain-misted forest. These are heritages of Carib countries. Here, Europeans, Africans and Asians settled. Over the centuries, they introduced from their own lands, favourite plants which, with the Caribbean's own flora, provide a garden catalogue of spectacular brilliance and beauty.....The variety of species grown in Caribbean gardens is the subject-matter of this book [and] it is a guide to successful gardening.....The glossary of popular and botanic plant names is useful alike to gardeners, visitors and students of botany."

The chapters of the text cover (a) the first gardeners historically and fascinatingly, (b) efficient and attractive plans for laying out the garden, (c) suggestions for hedges and lawns, (d) effective treatment of roses, orchids, African violets, bougainvillaeas, dahlias, and gladioli all as prominent favorites in cultivation in this large area, (e) soil improvement, (f) nature and control of pests and diseases, (g) propagation methods, and (h) monthly listings by blooms of a large number of plants that make the descriptive quotation above a reality.

The color plates, the four dozen black-and-white prints and the eight diagrams are excellent for clarity, attractiveness and guidance.

Advertisements separate from the text bring the book price down to an unbelievable $2.80.

The enthusiasm of the author and the artfully and thoroughly developed details show that this assignment was a labor of love for her and a culmination of many years of appreciative knowledge in this field.

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# THE POTOMAC RIVER AS THE NATURAL BARRIER FOR OXYDENDRUM, GALAX AND HEXASTYLIS

Clyde F. Reed *

In my studies of the flora of central eastern United States, three genera are remarkable in their distribution in that they are found only south and west of the Potomac River. In 1956 I called attention to this peculiar distribution for Hexastylis virginica and Galax aphylla when discussing the range of Eumeces inexpectatus (Herpetologica, 12: 136. 1956). This lizard has the southern shore of the Potomac River on Northern Neck as its northern limit. The range in Virginia for this lizard is mainly along the western edge of the Chesapeake Bay (Princess Anne, Norfolk, Nansemond, Southampton, Isle of Wight, James City, New Kent, Nottoway, King and Queen and Northumberland Counties; the Alleghany Co. record is in error). Galax aphylla and Hexastylis virginica have the same distribution along the western edge of the Chesapeake Bay, and then up the Potomac River to the 'bend', and then westward. Oxydendrum arboreum does get across the Chesapeake Bay to southern Delmarva and around Maryland to the west into southwestern Pennsylvania. In the present paper the Potomac River is indicated as the northern limit or northern natural barrier for Oxydendrum, Galax and Hexastylis in central eastern United States. In a later paper some 400 species of plants will be treated which find Delmarva, Maryland, Virginia and West Virginia as their northern limit for distribution in eastern United States.

I wish to thank the curators of the United States National Herbarium, the Carnegie Museum, Pittsburgh, and the herbarium of the West Virginia University for permitting me to study or annotate their specimens of these genera. All other specimens cited are in the Reed Herbarium unless otherwise noted.

## Oxydendrum arboreum (L.) DC.

The sourwood belongs to the family Ericaceae. It is a small tree with racemes of white flowers at the tips of the branches during the summer. In the fall the foliage turns a brilliant red before the leaves fall off. The racemes of pyramidal capsules stay on the trees all winter and usually abscise in the spring when the new buds expand. Map 1.

* Reed Herbarium, 10105 Harford Road, Baltimore 34, Maryland.

Sourwood ranges from Florida to Louisiana, then northward to Maryland on the Delmarva Peninsula (Worcester Co.) and to southern Assateague Island; throughout Virginia south and west of the Potomac River and its tributaries, then up into western Pennsylvania by way of West Virginia, and westward into Kentucky, Ohio and Indiana. No specimens of sourwood have been recorded in the wild from Maryland (except the single specimen from southern Worcester Co.), either on the Delmarva Peninsula or north of the Potomac River. Massey (1961, p. 159) gives the range in Virginia as general in the state. listing 21 counties. Strausbaugh & Core (1958, p. 706) state the species is found in all sections of West Virginia west of the Alleghenies.

Specimens representing the distribution of sourwood on the Delmarva Peninsula are given below. Tatnall (1942, p. 198) states that this species is common in woods in southern Accomac and northern Northampton Counties, Virginia.

MARYLAND: Worcester Co.: In thicket, south of Pocomoke City. Sept. 23, 1928. John Bright. (Carnegie).

VIRGINIA: Accomac Co.: Assateague Island, at causeway from Chincoteague Island. Aug. 1963. Reed; woods N of Accomac. June 6, 1955. Reed 41623; woods, Rt. 647. N of Locustville. June 5, 1955. Reed 39957; pinewoods, Metomkin Inlet Road, near Daugherty. Sept. 11, 1963. Reed 65496; edge of woods, E of RR, 3/4 mi. N of Belle Haven. Tatnall 2788 (GH); deciduous woods, N of Accomac. Sept. 23, 1928. John Bright. (Carnegie). Northampton Co.: Woods, 3 mi. SW of Eastville, Savage Neck. Oct. 22, 1955. Reed 37802; edge of woods, 1 mi. E of Bayford. June 8, 1958. Reed 41411.

The following specimens have been found along the lower Chesapeake Bay from Northern Neck (apparently only on the Rappahannock River side of the peninsula) to the Atlantic Ocean on the various peninsulas.

VIRGINIA: Richmond-Lancaster Co. line: Woods, Rt. 600, near county line in Richmond Co. May 27, 1956. Reed 37724; Mathews Co.: Woods along North River at junctions of Rts. 14 and 3, near Home of John Clayton. Aug. 7, 1959. Reed 44009; damp woods, 2 mi. SW of Mathews. Aug. 7, 1959. Reed 43966; Gloucester Co.: Wet woods near Achilles. Aug. 7, 1959. Reed 44024; York Co.: Woods near Grove. Aug. 8, 1959, quite common. Reed 44156; edge of woods, Rt. US 17, near Yorktown. Aug. 7, 1959. Reed 44031; Warwick Co.: Wooded slopes along Skiffs Creek. Aug. 8, 1959. Reed 44149; Princess Anne Co.: Woods, 3 mi. W of Pungo, Rt. 603. Aug. 27, 1958. Reed 42652; Southampton Co.: Woods along Nottaway River, Rt. 258, S of Franklin. Aug. 16, 1957. Reed 40086; Nansemond Co.: Pine barrens near Cox Landing. Aug. 14, 1939. L.B.Smith & A.R.Hodgdon 972. (WVaU).

Other Virginia records are: Bedford Co.: Woods near Boonsboro. Oct. 11, 1964. Reed 68675; Montgomery Co.: Woods on Brush Mt., Rt. 460, 2658 ft. elev., 5 mi. NW of Blacksburg. June 13, 1962. Reed 56506; Amherst Co.: Rt. US 60, 5 mi. W of Amherst. Oct. 11, 1964. Reed 68884; Rockbridge Co.: Rt. US 60, at Buena Vista. Oct. 11, 1964. Reed; Mecklenburg Co.: Wooded slopes along Pole Branch, Rt. 58, 1 mi. E of Boydton. May 10, 1965. Reed 69467; Botetourt Co.: Limestone cliffs at James River, Rt. 220. S of Iron Gate. Sept. 18, 1964. Reed 68885; woods near Fincastle. June 12, 1964. Reed 66605; Patrick Co.: Spoon Creek, N of Nettle Ridge, 5 mi. W of Henry Co. line, alt. 300 meters. June 30, 1938. F.R.Fosberg 15338. (WVaU); Craig Co.: Summit, Potts Mt., Rt. 311, N of New Castle. June 17, 1964. Reed 68993; Tazwell-Smyth Co.: Brushy Mt., summit, 3064 ft. elev. June 17, 1964. Reed 69013; Dickerson Co.: Georges Fork Gap, near Summit, Rt. 83. June 16, 1964. Reed 69057; Wise Co.: Pound Mt., Rt. 23, near Pound Gap. June 16, 1964. Reed 69059. In USNH: Alleghany, Isle of Wight, Roanoke, Smyth, Bedford, Giles, Buckingham, Nansemond, Norfolk, Warwick Counties.

WEST VIRGINIA: Barbour Co.: Laurel Mt. June 26, 1951. A.H.Haller. (WVaU); in woods near Boulder. Sept. 28, 1958. Karl Nestor. (Carnegie); Rt. 250, just N of Calhoun. July 18, 1965. Reed 69957; Braxton Co.: Woods along B&O RR tracks, Rt. 4, Gassaway. Aug. 29, 1959. Reed 45535; Sugar Creek, S of Gassaway. June 16, 1953. F.J. Boggs. (WVaU); Cabell Co.: Overgrown pasture, overlooking Holswade Park. July 17, 1939. F.A.Gilbert. (WVaU; SABC-52); Calhoun Co.: Pink. July 15, 1933. Ray Harris. (WVaU); banks, Little Kanawha River. July 4, 1890. C.F.Millspaugh 357. (WVaU); Arnoldsburg. July 1, 1932. Earl L. Core. (WVaU); Doddridge Co.: Along Rt. 55, 3 mi. W of Ashley. July 8, 1937. Earl L. Core 5586. (WVaU); near West Union. Aug. 3, 1943. Alvin Allison. (WVaU); Clay Co.: 1 mi. N of Clay. July 19, 1937. Earl L. Core. (WVaU); Fayette Co.: New River Gorge, Cotton Hill Station. July 7, 1932. Earl L. Core. (WVaU); Greenbrier Co.: Near Alta. Sept. 4, 1940. Wm. Basil Fox. (WVaU); Harrison Co.: Zeising. Aug. 1933. Robt. F. Martin 227. (WVaU); Shinn's Run, Shinston. July 12, 1939. C.L.Righter. (WVaU); Rt. 50, 2 mi. W of Clarksburg. July 17, 1965. Reed 69936; Kanawha Co.: Woods near Institute. July 8, 1931. Bot. Exped. W.Va.U. (WVaU); Watts Hill. Aug. 6, 1934. Miss Leslie Greenlee. (WVaU); woods, Queen Shoals. Aug. 1935. F.C.Randolph 14. (WVaU); Lewis Co.: Along Rt. 119, 2 mi. above Alum Bridge. June 22, 1957. E.A.Bartholomew & Dale Wilson. (WVaU); woods just N of Ireland, Rt. 4. Aug. 29, 1959. Reed 45546; Marion Co.: Old Grafton Road, clay soil in woods. July 17, 1929. T.E.Welch. (WVaU); Pricketts Creek. July 5, 1932. Fairmont State Teachers College. (WVaU); divide between State Road Run and Dudley Fork of Flat Run. July 5, 1937. Earl L. Core 5228. (WVaU); Marshall Co.: Hillside off Rt. 250 near Georgetown near Greene Co., Pa. line. July 17, 1965. Reed 69961; McDowell Co.: Johnny Cake. Sept. 2, 1941. Mildred L. Cox. (WVaU); Anawalt. Aug. 14, 1961. D.J.Music. (WVaU); Mercer Co.: Brush Creek Falls. July 16, 1931. Meade McNeil. (WVaU);

Pinnacle Rock. Sept. 1, 1940. Wm. Basil Fox. (WVaU); Mingo Co.: Chattaroy. 1955. Ben Millard. (WVaU); Monongalia Co.: South Park Bridge, Morgantown. July 10, 1914. John L. Sheldon. (WVaU); woods, Rt. 7, 1 mi. E of Bula. July 17, 1965. Reed 69950; near Behler. Sept. 10, 1929. Earl L. Core. (WVaU); Uffington. Aug. 11, 1931. P.J.Zucchero. (WVaU); Halleck, 2100 ft. elev. June 27, 1933. A.H. Anderson & F. Paul Smith 121. (WVaU); road bank along top of Chestnut Ridge between Greer and Tryon. July 24, 1960. E.A.Bartholomew & M.C.Beals. (SABC; Reed Herb.); Greer. Sept. 15, 1923. R.C.Spangler. (WVaU); on Chestnut Ridge, S of Morgantown. Aug. 23, 1921. S.S.Dickey. (Carnegie); edge of woods, Rt. 19, near Davis Hollow. July 16, 1965. Reed 69935; Monroe Co.: Wayside. Aug. 1, 1940. Wm. B. Fox 7. (WVaU); thicket, Peters Mt. July 1, 1931. F.W.Hunnewell 11944. (WVaU); Nicholas Co.: Near Nettie. Aug. 9, 1940. Wm. Basil Fox. (WVaU); Powell Mt. June 1, 1952. E.A.Bartholomew. (WVaU); Ohio Co.: Serpentine Drive, Oglebay Park. June 18, 1929. P.D.Strausbaugh 252. (WVaU); Pleasant Co.: Woods, 4½ mi. E of St. Marys. July 24, 1954. Eldon Ross. (WVaU); Preston Co.: Independence. July 21, 1898. W.E.Rumsey. (WVaU); recently cut woods near Sarver Schoolhouse. July 16-17. 1918. John L. Sheldon. (WVaU; Carnegie); near Cooper's Rock. Aug. 2, 1947. W.E.Buker. (Carnegie); Putman Co.: Nitro, Rt. 35. July 1957. Earl L. Core 6417. (WVaU); Raleigh Co.: Common along highway near C.C.Camp. Aug. 25, 1940. John Paul Tosh. (WVaU); Randolph Co.: Huttonsville. Sept. 1, 1938. Eugene E. Hutton. (WVaU); Ritchie Co.: 6 mi. from Cairo. Summer 1945. Kathryn Atha. (WVaU); along bank of Rt. 53 on hill descending to South Fork on Hughes River. June 15, 1958. E.A.Bartholomew & M.C. Beals. (Carnegie); Summers Co.: Near Sandstone. June 30, 1933. Weldon Boone 220. (WVaU); Taylor Co.: Valley Falls. July 30, 1959. Geo. E. Constable. (WVaU); Tucker Co.: Frequent in woods near Thomas, Canaan Valley. Aug. 9, 1945. H.A.Allard 11654. (WVaU); Tyler Co.: Roadside, 8 mi. Ridge, McElroy Dist. July 8, 1956. E.A.Bartholomew & Dale Wilson, T-190. (WVaU); woods, Rt. 13, at summit of mountain, Tyler-Wetzel Co. line. July 17, 1965. Reed 69943; Upshur Co.: Sago. July 25, 1946. E.C. & E.R.Grose. (WVaU); woods near Rock Cave. Aug. 29, 1959. Reed 45553; Wayne Co.: Missouri Branch, Cabwaylingo State Forest. L.W.Wilson & J.E.Friedel. (WVaU); same loc. June 13, 1952. Marie Overholts. (Carnegie); 1 mi. N of Ft. Gay. Sept. 12, 1931. Isabelle Lycan 107. (WVaU); Webster Co.: Edge of woods, Camp Caesar near Cowan. July 18, 1936. Louis Williams 488. (WVaU; Carnegie); same loc. Aug. 10, 1940. Wm. Basil Fox. (WVaU); Wetzel Co.: Smithfield. Summer 1936. Robt. H. Wagner. (WVaU); ridge between Hundred and Earnshaw. July 1, 1931. Oscar Haught 571. (WVaU); Rt. 7, 3 mi. E of Suter. July 17, 1965. Reed 69953; Long Drain Run, 1 mi. E of Hundred. July 17, 1965. Reed 69952; Wirt Co.: In old fields, 1 mi. up Little Kanawha River from mouth of Reedy Creek. Sept. 9, 1943. E.A.Bartholomew, W-1279. (WVaU). In USNH: Cabell, Lewis, McDowell, Monroe, Monogalia, Upshur, Preston, Wirt, Taylor, Webster, Tucker and Summers Counties.

WESTERN PENNSYLVANIA: Allegheny Co.: Toms Run above Dixmont. Oct. 16, 1915. O.E.Jennings. (Carnegie); Fayette Co.: Near Wymps Gap along road from Haydentown. Oct. 7, 1934. L.E.Lincoln. (Carnegie); on rocky mountain slope above North Branch of Rubles Run, SE of Haydentown. Aug. 24, 1940. O.E.Jennings et al. (Carnegie); Somerset Co.: near Somerset. Oct. 1950. Frank Curto. (Carnegie); Greene Co.: Along Duley Creek, Perry Twp. April 14, 1951. W.E.Buker. (Carnegie); Westmoreland Co.: Mt. Pleasant Twp., field near Brush Creek. July 14, 1900. O.P. Medgser & J.A.Shafer. (Carnegie); Mt. Pleasant. Oct. 12, 1915. (Carnegie); Mt. Pleasant. July 13, 1919. S.H.Williams. (Carnegie; WVaU); 4 mi. E of Mt. Pleasant. Aug. 1934. Thomas Chilcote, Jr. (Carnegie); Greene Co.: Hillside near Georgetown on Marshall Co., W.Va. line. July 17, 1965. Reed 69961.

Sourwood has been cultivated farther northward and eastward. Several nurseries in the East sell the sourwood tree for ornamentation. The following are a few of the localities from which I have obtained specimens.

MARYLAND: Baltimore City: Cultivated along street, University Parkway at Keswick Road. Aug. 29, 1963. Reed; Harford Co.: Jarrettsville, cultivated in yard. Nov. 4, 1962. Reed.

PENNSYLVANIA: Bucks Co.: Cultivated in lawn, Rt. 202, tree 14-16 ft. tall, just S of Doylestown. July 12, 1962. Reed 57712.

NEW JERSEY: Monmouth Co.: Several large trees, 12-25 ft. tall, edge of pine woods, Rt. 9, near Gordons Corners. July 24, 1960. Reed 47260; along Rt. 9 about 14 good size trees, many small ones in woods, near Gordons Corners, N of Freehold. Sept. 23, 1961. Reed 53252; 3 trees, Rt. 9, just N of Clayton Road. Sept. 23, 1961. Reed 53256.

CONNECTICUT: Fairfield Co.: Cultivated, Southport. Aug. 31, 1964. Reed.

## Galax aphylla L.

Galax belongs to the family Diapensiaceae. It is an evergreen herb, which has a long spike of white flowers standing about one foot tall, arising with a group of leaves from a short rhizome at the surface of the ground. Because there are no leaves on the stem of the spike, the name aphylla is appropiate. Map 2.

Fernald (1950, p. 1136) gives the natural range of this species as Virginia and West Virginia, south to Georgia and Alabama, and as

being cultivated and locally escaped north to Massachusetts. Massey (1961, p. 161) cites 21 counties in Virginia for this species, the counties ranging from near the Atlantic Ocean (Princess Anne Co.) and then westward into the Piedmont, Blue Ridge and Alleghanian zones, more or less along the drainage of the James River and its tributaries, as far north as Augusta Co. Strausbaugh and Core (1958, p. 718) list nine counties, in dry woods in the mountainous areas of West Virginia, as far north as Preston Co. and formerly to Monongalia County.

The following are new or additional county records that extend the range of Galax aphylla northward along the west side of the Chesapeake Bay to near the mouth of the Potomac River. This species has not been found north or east of the Potomac River, growing naturally.

VIRGINIA( Chesapeake Coastal Plain):Princess Anne Co.: Little Creek. Sept. 12, 1935. Fernald, Long & Fogg 4985. (US-1697158); Norfolk Co.: Near Norfolk. May 17, 1877. Lester F. Ward. (Reed Herb. 40212); Smith Lake. May 15, 1903. G.S.Miller. (US-646772 and 644774); Nansemond Co.: Bowers Hill, 7 mi. W of Portsmouth. May 31, 1882. Lester F. Ward. (Reed Herb. 40211; US-136119); Suffolk. June 11, 1899. Wm. Palmer. (US-343931); Southampton Co.: Franklin. Oct. 25, 1911. W.W.Eggleston 7789. (US-624140); James City Co.: Bluff along College Park, 3 mi. from Williamsburg. Aug. 2, 1940. Baldwin 797. (US-1789820); Middlesex Co.: Wooded slopes, SE of Hartfield, near Piankatank River. Aug. 7, 1959. Reed 43942; Lancaster Co.: Woods along John Creek, Merry Point. May 26, 1962. Reed (56159) and Winifred Harley; Northumberland Co.: Oak-hickory wooded slopes, 2 mi. N of Wicomico Church. May 27, 1956. Reed 39157.

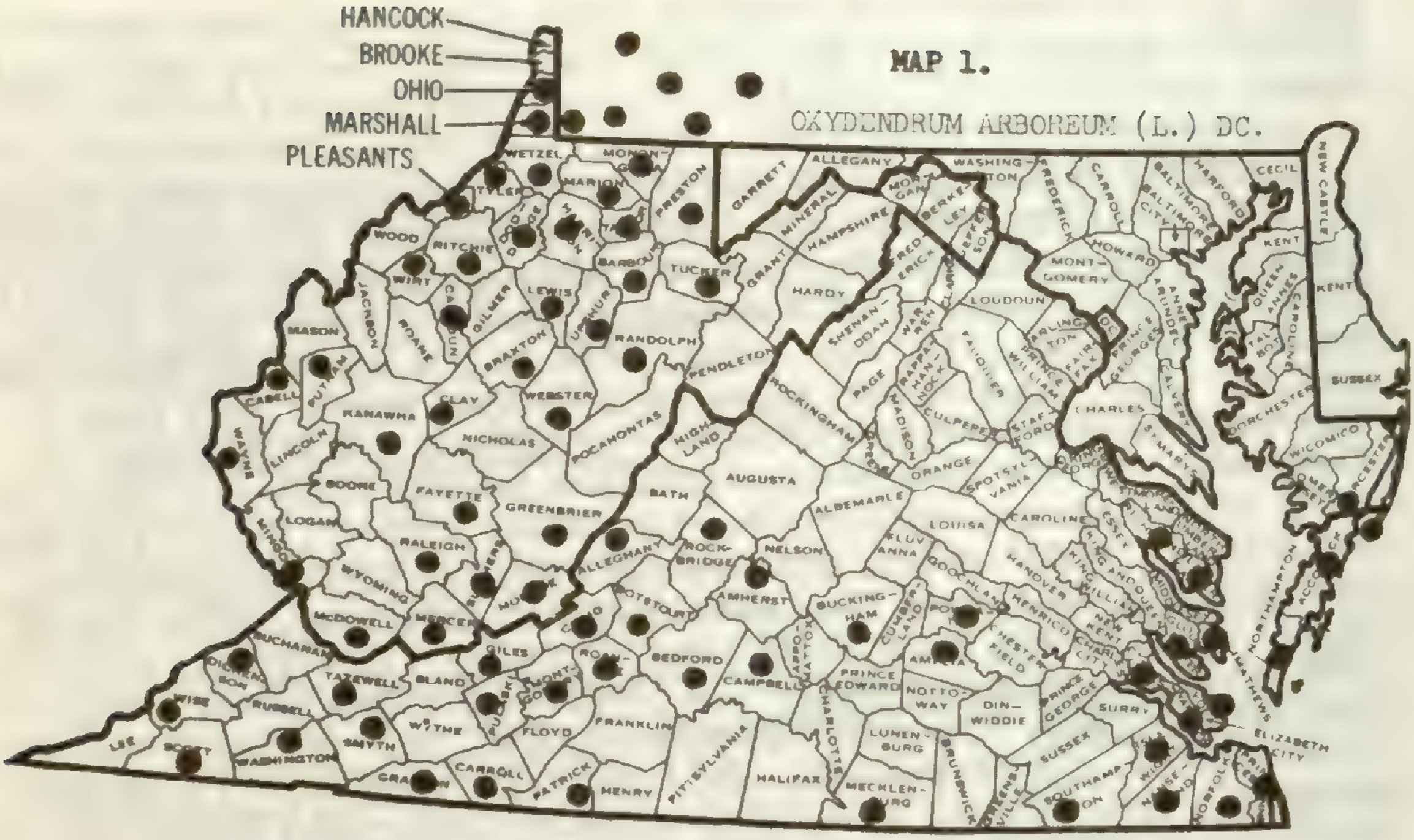
VIRGINIA( Piedmont):Henry Co.: Wooded hillsides, Rt. 57, along Smith River, near Bassett. Apr. 13, 1952. Reed 28191.

VIRGINIA( Blue Ridge):Carroll Co.: Woods just W of Cana. Apr.12, 1952. Reed 28134; Blue Ridge Mt., elev. 3000 ft., rocky woods, S of Fancy Gap, Rt. 52. Apr. 12, 1952. Reed 28127; Blue Ridge Parkway near Galax, large colonies in dense woods. Aug. 28, 1947. H.N.Moldenke 19253. (Reed Herb. 40735); Blue Ridge Nat. Pkwy. near Piper's Gap, SE of Galax. June 18, 1961. G.B.Rossbach 2642. (WVaU); Amherst Co.: Blue Ridge Pkwy., Upper Otter Creek Overlook, elev. 1005 ft., Mile #58. June 15, 1963. Reed 62447; Slatey Gap, Geo. Washington Nat. Forest. June 16, 1940. Baldwin 701. (US-1789804); Patrick Co.: Woods near entrance to Fairy Stone State Park, Rt. 57. Apr. 13, 1952. Reed 28123; rocky bluff near Stuart. July 2, 1940. Baldwin 738. (US-1789817); Rockbridge Co.: Natural Bridge. June 1, 1891. T.R.Churchill. (US-517773); Sept. 13, 1907. E.B.Bartram & B. Long. (US-607328); Bedford Co.: Peaks of Otter. July 18, 1906. Wm. Palmer 86. (US-605082 and 1438763); "Bedford Co." June 1868. A.H.Curtiss. (Carnegie);

Floyd Co.: Vicinity Creek. June 7, 1930. C.V.Morton 1729. (US-1846050); Botetourt Co.: Woods near Fincastle. June 12, 1964. Reed 66606.

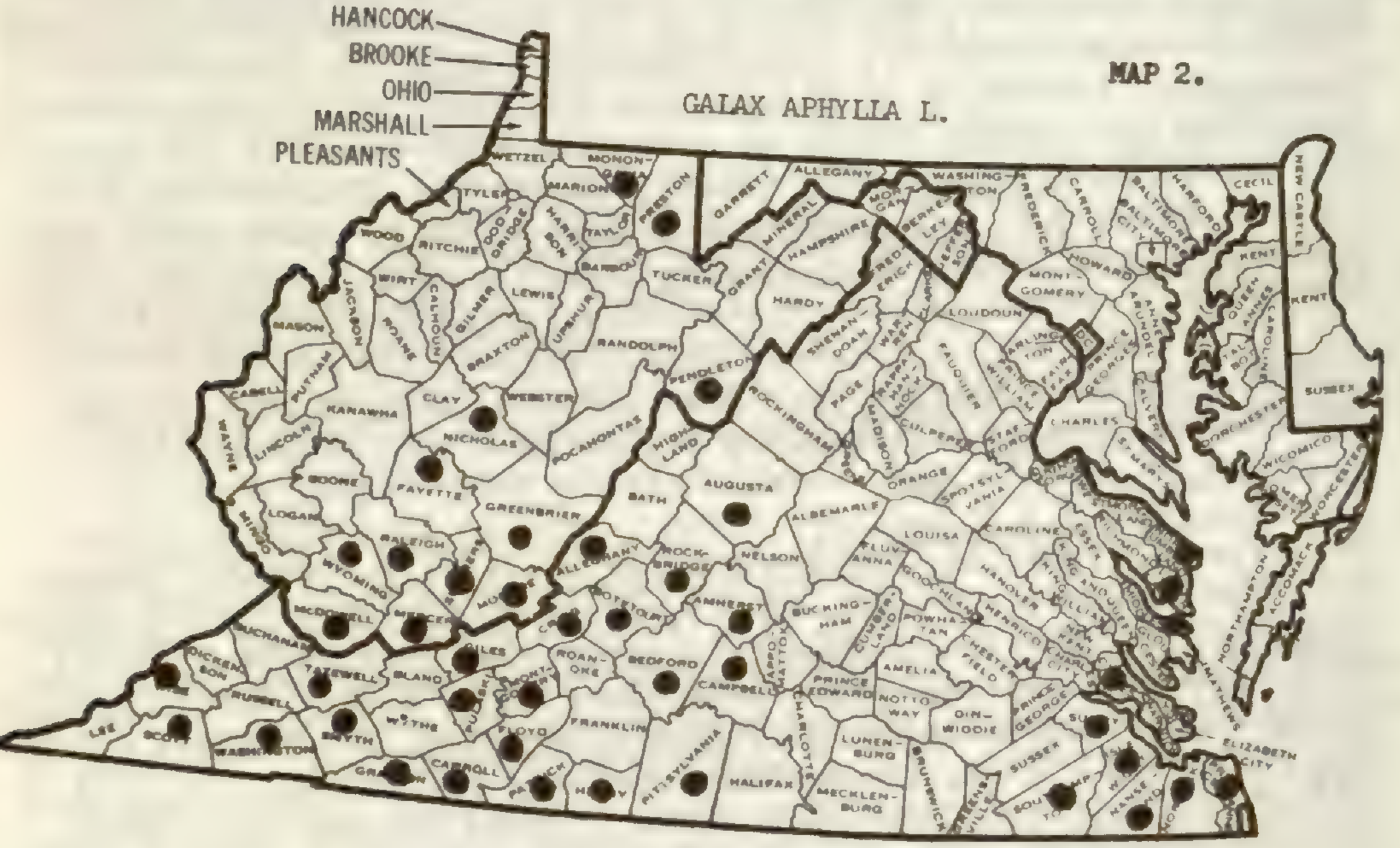
VIRGINIA( Valley and Alleghany Mts.): Alleghany Co.: Rocky hillside, Rt. 159, SW of Rt. US 60, near Callaghan. Jan. 1, 1956. Reed 36896; Montgomery Co.: Blacksburg. June 8, 1895. W.A.Murrill. (Carnegie); woods, Rt. 460, 1 mi. N of Blacksburg. June 13, 1962. Reed 56498; woods on Brush Mt., Rt. 460, elev. 2658 ft., 5 mi. NW of Blacksburg. June 13, 1962. Reed 56502; Giles Co.: In open woods, Salt Pond Mt. near Mountain Lake. June 17, 1939. F.A.Gilbert & L.G.Williams 768. (Reed Herb. 40733; US-1849828; Carnegie; WVaU); common in sandstone soil, along "Warspur Trail", Mt. Lake area. July 23, 1940. A.B.Massey 3921. (SABC: WVaU; Reed); Pearisburg. June 23, 1923. A.B.Meredith. (US-1341175); Salt Pond Mt., near Mountain Lake. Aug. 1876. Wm. M. Canby. (US-681558); Sept. 1884. Wm. M. Canby. (US-226931); Aug. 25, 1899. C.L.Pollard & W.R.Maxon 74. (US-357113); Rich Creek. June 18, 1940. J.T.Baldwin 708. (US-1789806); Pulaski Co.: Woods, Draper Mt., elev. 3500 ft., S of Pulaski. Apr. 16, 1959. Reed 42757; Wise Co.: Pound Mt., Rt. 23 near Pound Gap. June 16, 1964. Reed 69060; St. Paul. June 24, 1940. Baldwin 716. (US-1789810); Craig and Alleghany Co.: Potts Mt., Rt. 311, N of New Castle. June 17, 1964. Reed 68995; Potts Mt. Aug. 19, 1903. Steele & Steele 36. (US-490034); Grayson Co.: 1.5 mi. E of Galax. Dec. 25, 1946. Wm. H. Todd. (WVaU); Washington Co.: Shale cliffs in woods, between Damascus and Konnarock. Mar. 26, 1952. G.B.Rossbach. (WVaU); Smyth Co.: Vic. Marion, elev. 2100 ft. 1892. N.L. & E.G.Britton & Anna M. Vail. (Carnegie); Tazwell-Smyth Co.: Brushy Mt., summit, 3064 ft. elev. June 17, 1964. Reed 69015.

WEST VIRGINIA: Preston Co.: Near Lover's Leap, on Rt. 58. Aug. 26, 1952. W.E.Buker. (Carnegie); Big Sandy Creek. July 22, 1937. Mr. & Mrs. H.A.Davis 916. (WVaU); Little Sandy Creek. Sept. 22, 1956. E.L.Core & W.R.Lenhart. (WVaU); Fayette Co.: Babcock State Park. June 11, 1954. L.E.Hicks & Floyd Bartley 13. (WVaU); Summers Co.: Near Barger's Springs. June 9, 1939. Wm. B. Fox. (WVaU); Greenbrier Co:Sept. 25, 1904. John L. Sheldon 994. Ronceverte. (WVaU); Muddy Creek Mt. Aug. 5, 1926. Dept. Bot. Univ. W.Va. (WVaU); Pendleton Co.: Smoke Hole. Aug. 1931. Jane S. Netting. (Carnegie); Monroe Co.: Peters Mt., 1 mi. above Sweet Springs, Rt. 81. Apr. 6, 1935. Maurice Brooks & E.L.Core 4723. (WVaU); Potts Mt. Aug. 19, 1903. Steele & Steele 36. (US-490034); SW of Glace. May 28, 1954. G.S.Rossbach. (Carnegie); Wyoming Co.: Pineville. June 23, 1940. Baldwin 773. (US-1789807); 9.5 mi. SE of Pineville. Aug. 9, 1940. L.W. & J.E.Wilson. (WVaU); Raleigh Co.: Park behind Wilson High School. June 10, 1941. John Paul Tosh 814. (US-1846279); Beckley. July 17, 1931. E.L.Core 3121. (WVaU); Boy Scout Camp at Beaver. June 4, 1940. John Paul Tosh 258. (WVaU); Mercer Co.: Pinnacle Rock. June 24, 1940.




**MAP 1.**

OXYDENDRUM ARBOREUM (L.) DC.




**MAP 2.**

GALAX APHYLLA L.

Baldwin 715. (US-1789809); Old Lashmeet. July 1, 1948. Catherine Peeks. (WVaU); McDowell Co.: Welch. June 23, 1940. Baldwin 714. (US-1789808); Brown's Creek. July 4, 1928. Dept. Bot. Univ. W.Va. (WVaU); Monongalia Co.: Dille Farm near Morgantown. (Acc. Millspaugh, 1913, p. 327).

## Hexastylis Raf.

The evergreen leart-leaved gingers, often called heartleaves, belong to the family Aristolochiaceae. These herbs have rather leathery leaves which are aromatic, and may be mottled silvery. The flowers appear in the spring with the new leaves, and are maroon with yellow markings on the inside. For the heartleaves the Potomac River is a natural barrier, and Hexastylis virginica is the most widely distributed species of the genus in Virginia and West Virginia.

There has been considerable confusion as to the limiting characters of the various species of heartleaves and as to their distribution in the northern area. Fernald (1950, p. 564, under Asarum, sect. Ceratasarum A.Br.) put H. heterophylla (Ashe) Small in synonomy under H. virginica (L.) Small, but kept H. menningeri (Ashe) Small as a separate species, suggesting that it might be a local form of H. virginica. Gleason (1952, Vol. 2: 62) listed both H. heterophylla and H. menningeri as synonyms under H. virginica. Blomquist (1957, p. 255) monographed the North American species of Hexastylis, and recognized H. virginica (incl. H. menningeri) and H. heterophylla. Some herbarium sheets he annotated first H. virginica he later changed to H. heterophylla. In addition to these two species he discussed the distribution of several other species of this genus in Virginia and West Virginia, as H. lewisii, H. shuttleworthii, H. arifolia and its variety ruthii. Also he indicated that H. minor barely reaches the Virginia border in north-central North Carolina.

### Key to the species of Hexastylis in Virginia and West Virginia*

1. Style-extensions above the stigmas bifid to the stigmas, the lobes usually divergent at anthesis; leaf-blades triangular- to ovate-sagittate or -subhastate; when variegated, the light green areas between the principal veins; calyces narrowly to broadly flask-shaped or ovate, the lobes erect or more or less spreading, without a flange above and smooth within the tube.. .....6. H. arifolia.

* Key adopted from Blomquist, Brittonia, 8: 262-263. 1957.

1. Style-extensions above the stigmas not bifid to the stigmas, only notched at the apex; leaf-blades cordate to orbicular-cordate or orbicular-cordate or retuse; when variegated, the light green areas along the principal veins; calyces ridged-reticulate inside the tube, extensive and of high relief; calyces not flash-shaped, not contracted at the base.

2. Calyces without a flare about the middle or above, campanulate-urceolate, thin-walled, large, 3-5 cm. long by 2.5 cm. wide; ovary wholly superior, grooved below the stamens; style-extensions relatively long and slender; ridge-reticulations inside the tube a somewhat regular open network.....
.....4. H. shuttleworthii.

2. Calyces with a more or less prominent flare about the middle or above.

3. Calyces cylindric with a flare above the middle.

4. Plants with two kinds of rhizomes, some long and slender, the leaves therefore solitary and scattered, others short and freely branching, a few leaves therefore grouped, flower-bearing; calyces thin, with many vertical ridges inside the tube, the spreading lobes with long, whitish hairs inside; ovary superior.....
.....3. H. lewisii.

4. Plants with only short and freely branching rhizomes, the leaves therefore always grouped.

5. Calyx-lobes relatively short, 3-3.5 mm. long, erect to slightly spreading; ridged-reticulations inside the calyx-tube consisting of a close, irregular network of ridges; ovary about one-third inferior; leaf-blades cordate with mostly rounded apices to orbicular-cordate or retuse...1. H. virginica.

5. Calyx-lobes relatively long, 7-10 mm. long, ascending to moderately spreading; ridged-reticulations inside the calyx-tube consisting of distinct, vertical ridges, joined by a somewhat open, irregular network of ridges; ovary usually superior; leaf-blades cordate with obtuse to acute apices rarely orbicular-cordate or retuse, the basal lobes often overlapping over the petiole....2. H. heterophylla.

3. Calyces cylindro-campanulate with a prominent flare about the middle or slightly above, contracted above this, the lobes broad, about 12 mm. at the rounded base, strongly spreading; ridged-reticulations inside the calyx-tube consisting of a few distinct vertical ridges joined by many low, rounded ridges, the spaces between pit-like; leaf-blades prevailingly cordate with acute to obtuse apices.....5. H. minor.

1. Hexastylis virginica (L.) Small, Flora Southeastern United States, p. 1131. 1903; Blomquist, Brittonia, 8: 277. 1957. Map 3.

Syn.: Asarum virginicum L., Sp. Pl., p. 442. 1753; Heterotropa virginica (L.) A.Gray, Lond. Jour. Bot., 1: 225. 1842; Asarum menningeri Ashe, Jour. Elisha Mitchell Soc., 14: 35. 1897. (W.Va. to Carolina); Hexastylis menningeri (Ashe) Small, in Britton, Manual, 348. 1901.

Massey (1961, p. 86) listed 17 counties in Virginia for H. virginica in the following geographical zones: Chesapeake Coastal Plain-- Gloucester; Middle Coastal Plain-- Nansemond, James City, King William; Fall Belt-- Henrico; Piedmont-- Amelia, Louisa, Campbell, Henry; Valley and Alleghenies-- Botetourt, Rockbridge, Augusta, Montgomery, Wythe, Smyth, Scott, Washington. I have collected H. virginica in 14 additional counties in Virginia, extending the known range in this state north to the southern side of the Potomac River, from Northumberland Co. to Stafford Co. This species has never been found growing naturally on the north side of the Potomac River.

Fernald (1950, p. 564) gave the range as "Eastern Virginia to West Virginia, south to South Carolina and Tennessee". In southeastern Kentucky it is known from Letcher, McCreary and Harlan (Reed 7735A) Counties.

Strausbaugh and Core (1953, p. 322) give as the range of this species in West Virginia "Rich woods, frequent throughout the State, especially so on the western slopes of the Alleghenies; not noted east of the mountains, nor in the northern panhandle". However, H. heterophylla is not recognized, although H. menningeri is, but said to be similar to H. virginica.

VIRGINIA (Chesapeake Coastal Plain): Gloucester Co.: Gloucester. July 7, 1924. Meredith. (PA); Lancaster Co.: Woods along John Creek, Merry Point. May 26, 1962. Reed (56144) and Winifred Harley; wooded ravine, just SE of Lively. May 27, 1956. Reed 39126; low woods, 1 mi. N of Moraticco near Litwalton. May 27, 1956. Reed 37725; Middlesex Co.: Wooded slopes, NE of Hartfield, near Piankatank River. Aug. 7, 1959. Reed 43940 and 43941 (east of); Northumberland Co.: Damp pinewoods, Clark's Mill, 1 mi. N of Heathsville. June 1, 1946. Reed 5095 and 5125; same loc., May 15, 1954. Reed 33270; oak-hickory wooded slopes, 2 mi. N of Wicomico Church. May 27, 1956. Reed 39156; wooded ravine, 1 mi. S of Wicomico Church, Rt. 200. May 27, 1956. Reed 39140.

VIRGINIA (Middle Coastal Plain): New Kent Co.: Woods, Rt. 30, 4 mi. N of Barhamsville. July 7, 1961. Reed 51149; Isle of Wight Co.:

Sandy wastes between Zuni and Walters. Apr. 20, 1960. Reed 45154; sandy pine barrens, S of Zuni. Apr. 8, 1937. Fernald & Long 7009. (US-1699737): King & Queen Co.: Woods along Rt. 360, near Mattaponi River. June 29, 1954. Reed 34013; Prince Georges Co.: Wooded slopes, Garysville near Walls Run, Rt. 10. Apr. 9, 1960. Reed 46084; Richmond Co.: Along stream in low woods, ½ mi. SE of Warsaw. Apr. 22, 1946. Reed 4444; wooded slopes NE of Warsaw, on road to Callao. May 30, 1946. Reed 4949 and 4822; along stream SE of Warsaw. May 30, 1946. Reed 4977; wooded slopes, Chinn's Mill. May 31, 1946. Reed 5018; edge of pond at Ivondale near Farnham. June 5, 1954. Reed 33304; James City Co.: Low woods around pond, 3 mi. S of Williamsburg, on Jamestown Road. July 7, 1961. Reed 51130; Norfolk Co.: Dismap Swamp. Wm. H. Seaman. (US-786538); Nansemond Co.: Suffolk. June 10, 1899. Wm. Palmer & Paul Bartsch. (US-343925); Apr. 30, 1898. F.V.Coville & T.H.Kearney, Jr. 56. (US-355687); Southampton Co.: Shaded bank near Blackwater River, 1 mi. SW of Zuni. Apr. 6, 1937. Arthur S. Pease 25847. (US-2050790); Surry Co.: E of Carier Point. Fernald & Long 7815. (GH).

VIRGINIA (Fall Belt): Chesterfield Co.: Deep ravine, Rt. 10, 1½ mi. SE of Turnpike #95. Apr. 4, 1964. Reed 68214; Stafford Co.: Woods, Rt. 17, near Falmouth, 2 mi. NW of Fredericksburg. Aug. 13, 1962. Reed 58225; 3.5 mi. E of Falmouth. F.J.Hermann 10547. (GH, NY); Caroline Co.: Swampy woods, Rt. 301, 2 mi. N of Bowling Green. Nov. 14, 1959. Reed 45831; hillside along Rt. 301, N of Reedy Creek, near Penola. Feb. 9, 1957. Reed 38555; wooded slopes near stream, Rt. 301, 3 mi. N of Dawn. Feb. 9, 1957. Reed 38558.

VIRGINIA (Piedmont): Brunswick Co.: Wooded bluffs along Meherrin River, S of Lawrenceville. May 12, 1945. M.L.Fernald 14819. (US-2003520; GH; GA; TENN); Pittsylvania Co.: Between Fall Creek and Danville. June 3, 1891. J.K.Small & A.A.Heller 226. (US-18261; GH; NY; PA).

VIRGINIA (Blue Ridge): Bedford Co.: May 15, 1872. A.H.Curtiss. (Carnegie).

VIRGINIA (Valley and Alleghenies): Lee Co.: Woods, Rt. 66, near Kentucky State Line. June 21, 1947. Reed 7735B; Bath Co.: N of Millboro Spring, in Allegheny Mts. Sept. 3, 1907. C.F.Wheeler. (US-643314); Richardson Gorge of Jackson River, elev. 1700 ft. May 3, 1938. C.H.Boardman. (Carnegie); Augusta Co.: Staunton. May 20, 1896. W.A.Murrill. (Carnegie); Smyth Co.: North Fork of Houston River Valley, elev. 2200 ft. June 22, 1892. N.L. & E.G.Britton & A.M.Vail. (Carnegie); Craig-Alleghany Co.: Near Sweet Springs. Sept. 13, 1903. Steele & Steele 300. (US-490278, also given for Monroe Co., W.Va.); Giles Co.: Near Cascades. Brown et al. May 30-June 9, 1890. (NY).

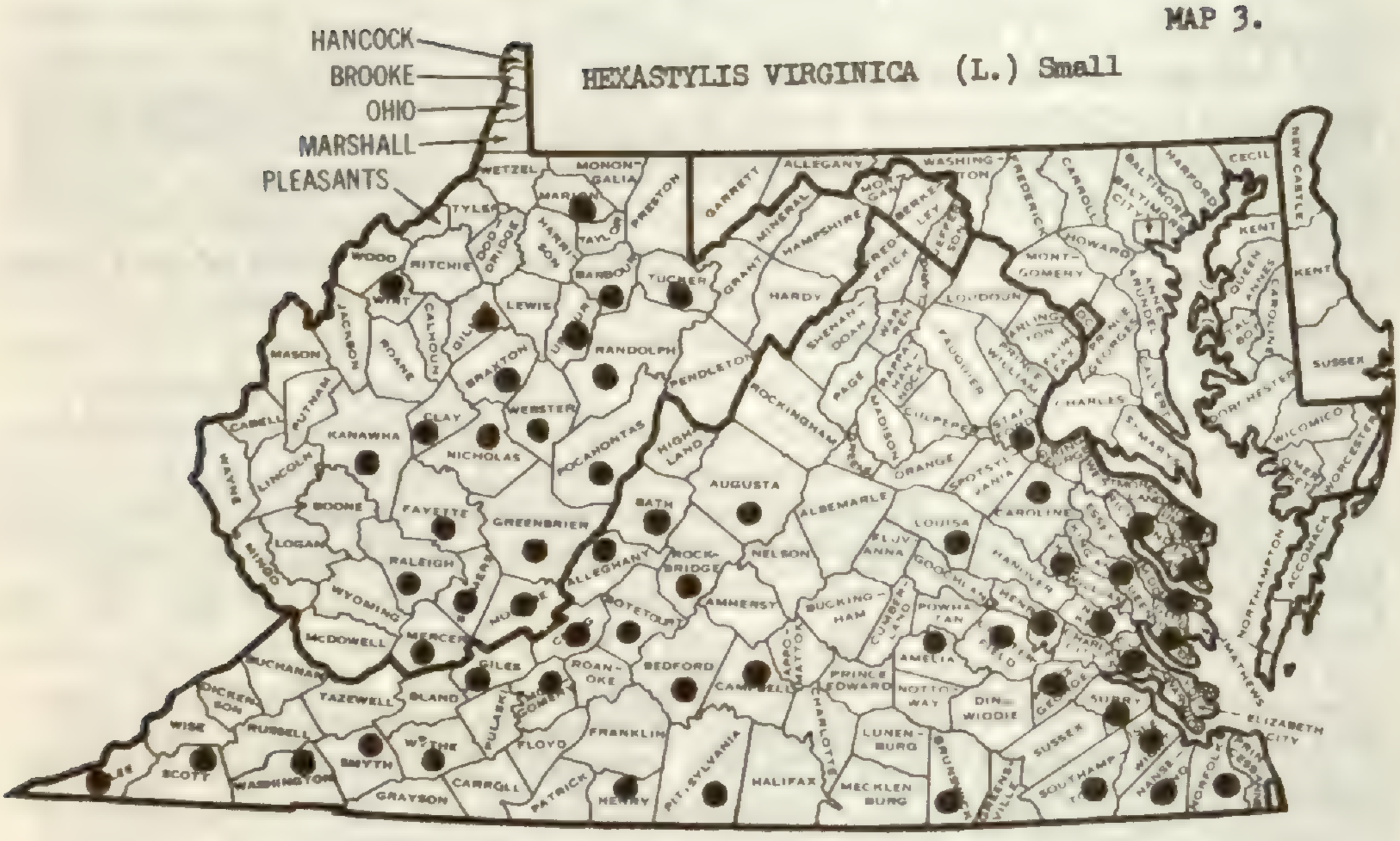
WEST VIRGINIA: Barbour Co.: Woods, 5 mi. S of Belington. Aug. 30, 1946. L.K.Henry. (Carnegie); Clay Co.: Lilly. Oct. 6, 1955. W.E.Sizemore & E.A.Bartholomew. (WVaU); Fayette Co.: Camp Beckwith. June 8, 1954. L.E.Hicks & Floyd Bartley 20. (WVaU); Bellwood near Ranelle. June 20, 1959. Weldon Boone. (WVaU); Gilmer Co.: Rt. US 119, 1.5 mi. from Lewis Co. line. Apr. 27, 1941. N.B.Green & M.G. Netting 957. (WVaU); just W of Linn, Rt. 119. Aug. 14, 1961. Reed 52192; Greenbrier Co.: Ronceverte. Sept. 25, 1940. John L. Sheldon 998. (WVaU); Howard Creek. Aug. 5, 1926. Bot. Exped. W.Va. Univ. (WVaU); Briery Knob, 1 mi. from Smokehouse Branch Fork of Big Clear Creek, 4.5 mi. from Anjean, elev. 3500 ft. Sept. 1, 1950. H.D. McCutcheon. (Carnegie); Beach Run of Little Clear Creek, 8 mi. from Beach's Tourist Home. June 16, 1951. H.D.McCutcheon. (Carnegie); North Caldwell. Oct. 20, 1933. Leonard & Leonard 16905. (US-1600324); limestone outcrop, along Culbertson Creek at Sunlight. June 20, 1959. Weldon Boone. (WVaU); Muddy Creek Mt. (Wherry, Castanea, 1: 24. 1936, as A. menningeri); Kanawha Co.: Mill Creek Falls. Apr. 25, 1940. Leslie Greenlee. (WVaU); rich damp woods, Queen Shoals. May 20, 1936. F.C.Randolph175. (WVaU); Marion Co.: Nan's Run near Fairview. June 23, 1917. Eva M. Fling. (WVaU); Mercer Co.: Open woods along Camp Creek. May 13, 1929. John Bright. (Carnegie); Bluefield. May 19, 1892. C.F.Millspaugh 1461. (WVaU); "Mercer Co." June 1934. Mildred Hadden. (WVaU); Monroe Co.: Sweet Springs. Sept. 13, 1903. Steele & Steele. (US-490278; NYBG, as A. menningeri); Nicholas Co.: May 1936. J.Creasy. (WVaU); Raleigh Co.: Rare, 1 mi. below Slabford. Apr. 22, 1940. John Paul Tosh. (WVaU); Slab Fork Creek. Apr. 6, 1940. J.P.Tosh 47. (WVaU); Tucker Co.: On Rt. 72, 10 mi. N of Parsons. May 30, 1954. J.L.Gable. (WVaU); Upshur Co.: French Creek. Apr. 6, 1924. Nelle Ammons. (WVaU); 8 mi. S of Buckhannon. Mar. 30, 1946. Edward C. Grose. (WVaU); French Creek. Apr. 19, 1935. Maurice Brooks. (WVaU); near Bucklin. Apr. 13, 1895. W.M.Pollack. (US-261533); "Upshur Co." May 9, 1897. W.M.Pollack. (US-490278 and 315229); Buckhannon. May 12, 1913. S.C.Grose (4651). (WVaU); Alexander. Aug. 29, 1938. E.L.Core. (WVaU); Webster Co.: Woods along Gauley River, Camp Caesar. Apr. 12, 1941. Mr. & Mrs. H.A.Davis 4702. (WVaU); Wirt Co.: On rock along bank of Standingstone Creek, ½ mi. below mouth of Deavers Fork. June 6, 1951. E.A.Bartholomew, W-3039. (WVaU); Braxton Co.: Near Frametown. Palmer 39545. (GH); Pocahontas Co.: Near Marlinton. Hunnewell 18951. (GH).

2. Hexastylis heterophylla (Ashe) Small, Flora Southeastern United States, p. 1131. 1903; Blomquist, Brittonia, 8: 272. 1957. Map 4.

   Syn.: Asarum heterophyllum Ashe, Jour. Elisha Mitchell Soc., 14: 33-34. 1897; Asarum heterophyllum ochranthum Ashe, Jour. Elisha Mitchell Soc., 14: 34. 1897.

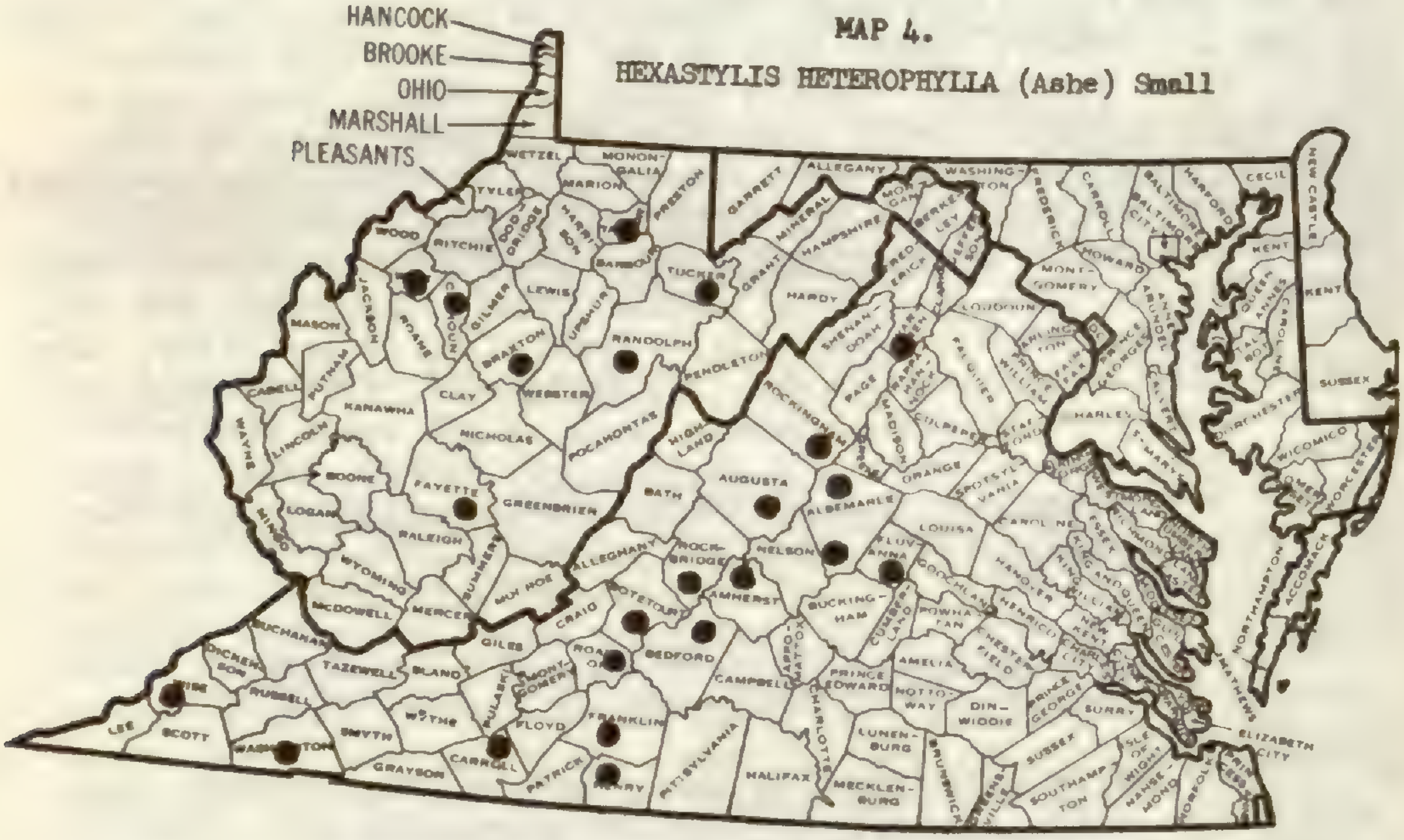
MAP 3.

HEXASTYLIS VIRGINICA (L.) Small




MAP 4.

HEXASTYLIS HETEROPHYLLA (Ashe) Small



VIRGINIA: Warren Co.: Between Happy Centre and Burrys Ferry. Aug. 16, 1897. Gerritt S. Miller, Jr. (US-413325); Rockingham Co.: Mt. Crawford, elev. 1200-1500 ft. May 5-13, 1893. (US-18264); foot and slopes of Blue Ridge Mts., Elkton, on Shenandoah River. Aug. 18, 1918. E.S.Steele. (US-2344506); Augusta Co.: West side of Blue Ridge, along creek. Apr. 25, 1921. W.W.Eggleston 17691. (US-1220664); Bedford Co.: A.H.Curtiss. May, 1866. (US; PA); Albemarle Co.: Howardsville. May 10, 1934. E.S.Rawlinson 156. (US-1622981); Roanoke Co.: Poor Mt., 2½ mi. NW of Airport P.O. June 14, 1946. C.E.Woods, Jr. 6003. (US-2051013): Wise Co.: Pound Mt., Rt. 23, near Pound Gap. June 16, 1964. Reed 69061; Washington Co.: Wooded slopes, Abrams Falls, NW of Bristol, off Rt. 58. June 15, 1964. Reed 69095; Rockbridge Co.: Cedar Creek, rich woods, Natural Bridge. Apr. 28, 1886. Walter Deane. (WVaU).

WEST VIRGINIA: Fayette Co.: Rocky woods at Camp Beckwith. June 7, 1954. L.E.Hicks & Floyd Bartley 2111. (US-2178775); Taylor Co.: Boothsville, Hustead's Fork. June 1949. G.E.Constable. (WVaU); Braxton Co.: Glendon, Apr. 6, 1953. F.J.Boggs 18. (WVaU); sandstone ridge, 850 ft. elev., Little Kanawha River at Rt. 119, Falls Mills. Apr. 21, 1956. G.B.Rossbach 861. (WVaU); Randolph Co.: Pickens. Spring 1937. Howard Perine, (WVaU); Calhoun Co.: Pink. Apr. 19, 1933. Ray Harris. (WVaU); Wirt Co.: Burned over woods along Standingstone Creek, just below Hartley Road, Apr. 20, 1947. E.A.Bartholomew W-1677. (WVaU); Tucker Co.: Nestorville, St. George Road, 8 mi. W of St. George. Apr. 23, 1955. R.B. & J.Clarkson 303. (WVaU); Summers Co.: Madams Creek. May 5, 1932. Weldon Boone 41. (WVaU).

3. Hexastylis lewisii (Fern.) Blomquist & Oosting, Spring Flora Piedmont North Carolina, p. 50. 1948; Blomquist, Brittonia, 8: 274. 1957. Map 5 (dots).
   Syn.: Asarum lewisii Fernald, Rhodora, 45: 398-400, t. 774-775. 1943; Hexastylis pilosifera Blomq., Castanea, 10: 75-80, f. 1-3. 1945. (N.C.).

VIRGINIA: Lunenburg Co.: Open oak woods, Rt. 137, 1 mi. NW of Dundas. May 10, 1965. Reed 69445; Mecklenburg Co.: Pine-oak woods, 1 mi. W of Brodnax. May 10, 1965. Reed 69456; low woods and slopes, 4 mi. E of South Hill, Rt. 58. May 10, 1965. Reed 69459; Brunswick Co.: Seward Forest, SE of Ante, very abundant. Sept. 15, 1944. M.L. Fernald & J.B.Lewis. (US-2003414); same loc., May 11, 1946. Fernald 14814. (US-2003529; GH); Oak woods, 1 mi. SE of Brodnax. May 10, 1965. Reed 69457; Greensville Co.: May 17, 1943. J.B.Lewis. (GH).

Plants which look intermediate between H. virginica and H. lewisii are: James City Co.: Wooded ravine, Lake Matoaka near Williamsburg. Mar. 19, 1948. Karl H. Zickrick, Jr. (WVaU); same loc.,

Mar. 16, 1948. Robeley M. Miles. (WVaU); New Kent Co.: On long peninsula formed by Chicahominy River and Diascond Creek, near Lanexa. Nov. 24-26, 1938. Neil D. Richmond. (WVaU).

4. Hexastylis shuttleworthii (Britton and Baker) Small, in Britton, Manual, 347. 1901; Blomquist, Brittonia, 8: 270. 1957. Map 5 (plus).

Syn.: Asarum shuttleworthii Britton and Baker, Jour. Bot., 36: 98. 1898; Asarum (Homotropa) macranthum Shuttl., mss. distr. Rugel, 1841; Asarum virginicum L. 'b' grandiflorum "Michx." ex Duchartre, in DC., Prodr., 15: 426. 1864; Asarum grandiflorum (Duchartre) Small, in Small & Vail, Mem. Torr. Bot. Club, 4: 150. 1894; non Klotzsch, Monatsber. Akad. Wiss. Berlin, 1859: 586. 1859; Asarum macranthum (Shuttl.) Small, Mem. Torr. Bot. Club, 5: 136. 1894; non Hook. f., Bot. Mag., t. 7022. 1888; Homotropa macranthum Shuttlew. ex Small, in Small & Vail, Mem. Torr. Bot. Club, 4: 150. 1894.

VIRGINIA: Wise Co.: Seymour. July 31, 1891. (DUKE).

WEST VIRGINIA: Summers Co.: In oak and beech woods near Barger's Spring. July 13, 1900. E.L.Morris 980. (US-388654); Monongalia Co.: Near Morgantown. Aug. 1931. Zucchero. (Zucchero, Jour. S. Appal. Bot. Club, 1: 7. 1936; Strausbaugh & Core, Flora of W.Va., Part II: 322, fig. 1953).

5. Hexastylis minor (Ashe) Blomquist, Brittonia, 8: 275 (minus). 1957.

Syn.: Asarum virginicum sensu Ashe, Jour. Elisha Mitchell Soc., 14: 31. 1897; non Linn., Sp. Pl., 442. 1753; Asarum minus Ashe, Jour. Elisha Mitchell Soc., 14: 33-34. 1897. (Carolina to Tenn.).

This species is included here because it comes so close to the southern border of Virginia in the north central part of North Carolina (Granville, Orange and Wake Counties, which are just south of Halifax and Mecklenburg Counties, Virginia) that further search in south central Virginia will probably reveal it to be there.

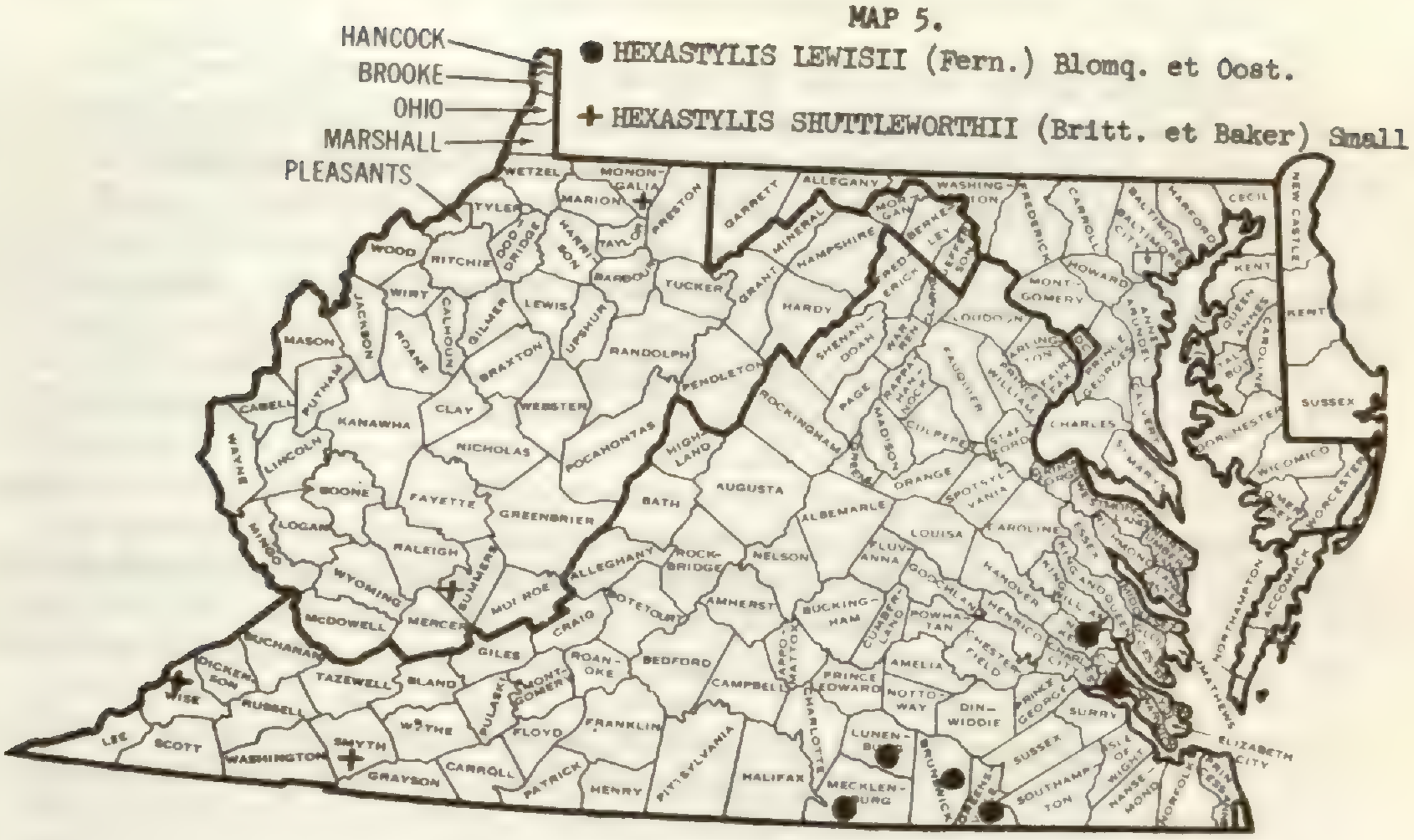
6. Hexastylis arifolia (Michx.) Small, Flora Southeastern United States, p. 1132. 1903; Blomquist, Brittonia, 8: 263. 1957.

Syn.: Asarum virginicum Walt., Fl. Car., 143. 1788; non Linn,, Sp. Pl., 442. 1753; Asarum arifolium Michx., Fl. Bor. Am., 1: 279. 1803; Heterotropa arifolia (Michx.) A.Gray, Lond. Jour. Bot., 1: 225. 1842.

MAP 5.

● HEXASTYLIS LEWISII (Fern.) Blomq. et Oost.

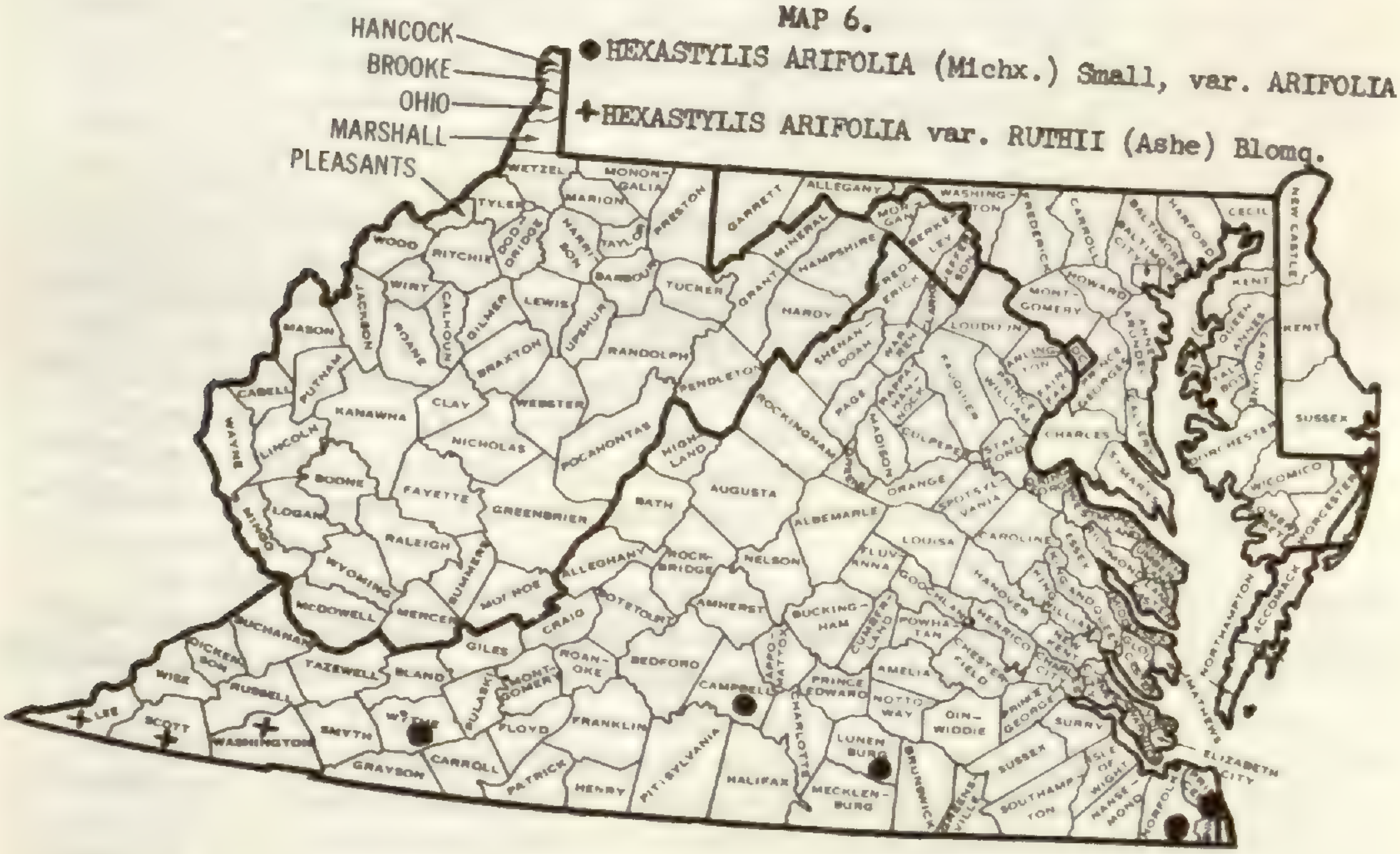
✚ HEXASTYLIS SHUTTLEWORTHII (Britt. et Baker) Small




MAP 6.

● HEXASTYLIS ARIFOLIA (Michx.) Small, var. ARIFOLIA

✚ HEXASTYLIS ARIFOLIA var. RUTHII (Ashe) Blomq.



Calyx-tube flash-shaped, 3 cm. long by 3 mm. wide to 8 cm. long by 9 mm. wide at anthesis, the lobes more or less spreading.. .....var. arifolia.

Calyx-tube ovate to slightly contracted below the lobes, the lobes erect to slightly spreading, 2 cm. long by 2 mm. wide to 4 cm. long by 4 mm. wide at anthesis...var. ruthii.

6a. Hexastylis arifolia (Michx.) Small, var. arifolia. Map 6 (dots).

VIRGINIA: Norfolk Co.: Britton & Small. May 25, 1893. (NY); Princess Anne Co.: Fernald & Griscom 4388. (GH); Lunenburg Co.: Pine barrens, Rt. 40, 3 mi. E of Keysville in Lunenburg Co. June 14, 1963. Reed 62486; Campbell Co.: (Massey, Flora of Va., p. 86. 1961); Wythe Co.: (Massey, 1961: p. 86). Variety is not indicated, but may be ruthii, since most of the specimens from the mountainous regions are.

6b. Hexastylis arifolia var. ruthii (Ashe) Blomq., Brittonia, 8: 268. 1957. Map 6 (plus).

Syn.: Asarum ruthii Ashe, Jour. Elisha Mitchell Soc., 14: 35-36. 1897; Hexastylis ruthii (Ashe) Small, Flora Southeastern United States, p. 1137. 1903.

VIRGINIA: Lee Co.: Blackwater. Carr 960.(GH); Scott Co.: Vic. of Hinton. Carr 817. (GH); Washington Co.: N of Bristol, elev. 1800 ft. May 24, 1902. Addison Brown. (US-18270; GH).

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# MATERIALS TOWARD A MONOGRAPH OF THE GENUS LIPPIA. VI

Harold N. Moldenke

LIPPIA ORIGANOIDES H.B.K.

Slender very aromatic shrub or shrubby tree, to 3 m. tall, much-branched, weak and spreading or erect, with a sagebrush odor; stems fruticose; branches woody, subterete, striate, hirtous-pubescent, subcanescent; leaves decussate-opposite, aromatic, petiolate; petioles subterete, about 8 mm. long, subcanaliculate above, hirtous-pubescent; leaf-blades green or deep-green above, silvery-gray beneath, membranous but rather rigid, lanceolate or ovate-oblong, 1.8—6 cm. long, 0.6—3 cm. wide, acute to obtuse at the apex, crenate or denticulate along the margins, rounded at the base, rugose and pilose-hirtous above, puberulent to softly hirtous-tomentose and canescent beneath, often very densely white-tomentose, reticulate-venose; midrib and secondaries prominent beneath; inflorescence axillary, whorled, showy, 4—6 per leaf-axil, pedunculate; peduncles 4—5 mm. long, pubescent; heads ovate-tetragonal, 4—6 mm. long, much shorter than the subtending leaves, slightly surpassing the petioles; flowers small, showy, sessile in the bractlet axil, in 4 series, about 4 mm. long, with a sagebrush odor; bractlets ovate, in 4 series, imbricate, acute at the apex, shorter than the flowers, 3—5-veined, pubescent on the back, ciliate along the margins; calyx ovate, compressed, bifid, somewhat pilose, ciliate, the lobes equal, 2-toothed at the apex; corolla hypocrateriform or subhypocrateriform, white or dull-white to whitish, pilosulous on the outside, the tube usually pale-yellow, terete, inflated at the center, 3 times as long as the calyx, the limb 2-lipped, flat, the upper lip emarginate, the lower lip twice as long, 3-fid, the lobes rounded, the middle one larger; stamens didynamous, inserted in the swollen part of the corolla-tube, included; filaments very short; anthers didymous, compressed; style capillary, glabrous, half as long as the corolla-tube; stigma obliquely capitate; ovary glabrous, ovate; fruit obliquely obovate, subcompressed, 2-celled, 2-parted, smooth, glabrous, fuscous, minute, covered by the calyx, the cells 1-seeded, one seed often aborted.

The type of this common northern South American species was collected in September by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland on dry hills near Punta Araya in the Cumana region, Sucre, Venezuela. The type of L. berterii was collected by Carlo Giuseppe Bertero in Magdalena, Colombia, and deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17496, now destroyed. The so-called L. origanoides var. sampaionis Hert. is a synonym of L. salviaefolia Cham.

Lippia origanoides has been found in thickets, among bushes, along roadsides, in full exposure to the sun on savannas, the lower slopes of mountains, dry hills, dry steep slopes, southwest-facing

slopes bordered by hilly savannas, and semi-deserts, from sea-level to 2300 meters altitude, flowering from April to February, fruiting in September and November. Curran & Haman report it "common on lower mountain slopes" in Venezuela, where Maguire and his associates call it "locally subdominant in savannas", "locally frequent on open hilltops", "frequent on roadsides", "frequent on granitic lava", and "frequent in grassy areas". In Colombia it is said by Haught to be "very abundant on limestone soil", by Langenheim "common in sandy rocky floodplain areas of thorn forest", and by Smith "common in dry scrubby growth in rocky (sometimes sandy) land near the sea or a few miles inland".

The flowers are described as "white" on Alston 6378, Curran & Haman 1150a, Haught 3887 & 6644, Killip 37233, Langenheim 3087, Maguire, Wurdack, & Bunting 35970, H. Pittier 9671 & 10542, H. Saint John 20718, Sandeman 5991, and H. H. Smith 587, as "dull-white" on Steyermark 58601, as "whitish" on Tamayo 4147, and as "white, the tube pale yellow" on Wurdack & Monachino 40974. Vernacular names recorded for the plant are "chara-ceúr", "oreganillo", "oregano", "orégano", "orégano cimarrón", "orégano de burro", "oregano del pais", and "poleo". Calpouzos (1954) points out that the names "oregano", "oregeno", "origano", or "oragano" are applied also to L. affinis Schau., L. formosa T. S. Brandeg., L. fragrans Turcz., L. graveolens H.B.K., L. micromera Schau., L. micromera var. helleri (Britton) Moldenke, L. palmeri S. Wats., L. palmeri var. spicata Rose, Lantana involucrata L., L. achyranthifolia Desf., L. trifolia L., Coleus amboinicus Lour., Hedeoma floribunda Standl., H. patens Jones, Hyptis albida H.B.K., H. americana (Aubl.) Urb., H. capitata Jacq., H. suaveolens (L.) Poit., Limnophila stolonifera (Blanco) Merr., Monarda austromontana Epl., Ocimum basilicum L., Origanum vulgare L., O. majorana L., Poliomintha longiflora Gray, and Salvia sp.

Pittier reports the plant as medicinal in Venezuela, where Tamayo states that the leaves are used as a condiment to give a pleasant taste with meats, and Steyermark reports that the leaves are boiled in water with guarapo (a sugar drink) and used against colds.

Material of this species has been misidentified and distributed in herbaria under the names L. affinis Schau., L. alba (Mill.) N. E. Br., L. graveolens H.B.K., Lantana involucrata L., Lantana cfr. salvifolia Jacq., and Lantana sp. On the other hand, the Kuntze s.n. [Sta. Cruz, 1000 m., V.92], distributed as L. origanoides, is L. affinis Schau.; H. H. Rusby 704, Saer 196, and O. E. White 905 are L. alba (Mill.) N. E. Br.; J. F. de Castro 75, P. Clausen s.n. [Aug.—April 1840], Freire & Zeredo s.n. [Herb. Rio de Jan. 31563], Gehrt & Hoehne s.n. [Herb. Inst. Bot. S. Paulo 17462], Herb. Inst. Bot. S. Paulo 31301, F. C. Hoehne s.n. [Herb. Inst. Bot. S. Paulo 4859] & Com. Rondon 1307, Löfgren 248, Pizarro 118, and Regnell III.

942 are L. elegans Cham.; G. F. Gaumer 832 and Edw. Palmer 2771 are L. graveolens H.B.K.; R. S. Williams 307 is the type collection of L. pendula Rusby; Ule s.n. [Herb. Rio de Jan. 31635] is L. rubiginosa Schau.; and another P. Clausen s.n. [Aug.--April 1840] and Regnell III.942 [3/5/1847] & III.942 [25/10/1848] are L. sidoides Cham. The Gray Herbarium sheet of Lehmann B.T.818 is Phyla nodiflora var. canescens (H.B.K.) Moldenke.

Schauer (1847) places this species in his Section Goniostachyum and regards it as conspecific with L. elegans Cham. of Brazil. Steudel (1840) and Walpers (1845) give Gardoquia origanoides as a synonym of Lippia origanoides, but actually Reichenbach's name applies to L. micromera Schau., as has been proved by examination of the type in the Sieber herbarium. Schauer (1851) cites a P. Clausen 1037, J. E. Pohl s.n. [ad Correa et Formigas], L. Riedel s.n. [Villa Rica], and Sellow s.n. [Villa Rica] from Minas Gerais, and a J. E. Pohl s.n. [in monte Serra do Caxeiro] from Goías, but these collections are doubtless all to be referred to L. elegans. He cites also an unnumbered Otto collection from Venezuela, which is probably correctly placed. Hayek (1908) cites Wacket s.n. [in circuitu urbis Sorocaba] from São Paulo, and Martínez (1937) records the species from Tabasco and Yucatán, Mexico --both identifications doubtless erroneous.

In all, 93 herbarium specimens of L. origanoides and 9 mounted photographs, including phototypes of all the names involved, have been examined by me.

Citations: MARGARITA ISLAND: Ginés 2768 (W--2174229), 3069 (W--2174388). COLOMBIA: Cundinamarca: H. García Barriga 4875 (W--1594225). Magdalena: Araque Molina & Barkley 18Mg088 (Es, N), 18Mg089 (N); Bertero s.n. [Macbride photos 17496] (It--photo, Kr--photo, N--photo, N--photo, W--photo); H. M. Curran 380 (Ew), s.n. [June 1916] (W--537602); Dawe 499 (W--1423276); Haught 3887 (N, S), 6644 (Hw); H. H. Smith 587 (Br, Cm, N, Vt, W--533081). Nariño: Garganta Fábregas 538 (F--1292036); Triana s.n. [Pasto] (W--1481423). Norte de Santander: Araque Molina, Otálora, & Barkley 18NS043, in part (N); Garganta Fábregas 1119 (F--1294538), 1130 (F--1294530). Santander: Herb. Hort. Bot. Reg. Kew. s.n. (N); Langenheim 3087 (W--2266580); H. Saint John 20718 (N, N); Sandeman 5991 (K). State undetermined: Lehmann B.T.818, in part (N); Otto 456 (Br); Triana s.n. (Hn). VENEZUELA: Bolívar: H. M. Curran 199m (N), 213m (N); Killip 37233 (N, Ve--12761, W--1855376); Lasser & Vareschi 2779 (Ve); B. Maguire 32657 (N, S); Maguire, Wurdack, & Bunting 35868 (N), 35970 (N), 35997 (N), 36021 (N); T. A. Sprague s.n. [Ciudad Bolivar, Nov. 1898] (K); Steyermark 57640 (F--1221918, N), 58601 (N); Tamayo 3122 (W--1906651), 3474 (Ve, Ve); Wurdack 34376 (N); Wurdack & Guppy 23 (N); Wurdack & Monachino 40974 (N).

Carabobo: Curran & Haman 1150 (W--1011124), 1150a (N, W--1043443). Falcón: Curran & Haman 606 (N, W--1043286); Lasser & Foldats 2956 (Ve--36554); Tamayo 975 (Ve--12750), 976 (W--1778313). Federal District: Boldingh 3947 (Ut--115369b); Curran & Haman 966 (N, W--1043381); H. Pittier 8096 (Ve, W--988197), 9671 (Ba, N, Ve--12752, Vi, W--1120735); Robinson & Lyon s.n. [July 13, 1900] (W--531799); Rose & Rose 21723a (W--763440). Guárico: Tamayo 4147 (W--2221008). Lará: Alston 6378 (S, W--2440228); Marcuzzi s.n. [Baraquisimeto] (N); Saer 62 (Ve, W--1189690); Tamayo 326 (N, Ve, W--1744865), 3750 (N). Miranda: H. Pittier 8251 (Ve, W--988352). Sucre: Humboldt & Bonpland s.n. [Macbride photos 39482] (It--photo of type, Kr--photo of type, N--photo of type, W--photo of type). Zulia: H. Pittier 10542 (N, Ve--12751, Vi, W--1187219). BRAZIL: Rio Branco: Maguire & Maguire 40022 (N, S), 40377 (N). CULTIVATED: Cuba: Calvino 107 (N). Venezuela: Tamayo 4624 (Ve--55933).

LIPPIA OXYCNEMIS Schau. in A. DC., Prodr. 11: 589. 1847.

Synonymy: Lippia oxycenemis Schau. ex Moldenke, Alph. List Invalid Names Suppl. 1: 15, in syn. 1947.

Bibliography: Schau. in A. DC., Prodr. 11: 589. 1847; Schau. in Mart., Fl. Bras. 9: 244. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 99. 1877; Jacks. in Hook. f & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 15. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Alph. List Cit. 3: 689, 824, & 969 (1929) and 4: 1105, 1135, & 1205. 1949; Moldenke in Dawson, Los Angeles Co. Mus. Contrib. Sci. 7: 11. 1957; Moldenke, Résumé 94, 316, & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 12: 24 & 102. 1965.

Suffruticose or an erect shrub, to 3 m. tall, with very variable pubescence, sometimes subvillous-hirsute, sometimes hirtous, sometimes strigillose; stems erect, tetragonal, hirsute; leaves decussate-opposite or ternate, rigid; petioles short, hirsute; leaf-blades stiff, paler beneath, elliptic or oblong, acute at the apex, attenuate into the petiole at the base, crenate-serrate along the margins except for the entire base, penninerved, rugose, strigose-hirtous or hirsute above with often bulbous-based hairs, tomentose beneath, hirtous or villous-hirsute on the venation beneath; panicle terminal, cymose, its branches opposite or verticillate, mostly simple, sometimes dichotomous; heads squarrose, strobiliform, globose or ovoid; bractlets lilac, scale-like, cuspidate at the apex, ovate at the base, sericeous or pubescent-strigose on the back, closely imbricate, equaling the corolla-tube; calyx very short, shortly bifid, villous; corolla hypocrateriform, rose, rose-pink, or pink to violet, violet-lilac [as in

Euphrasia officinalis L.], or lilac, or even blue, 4 mm. long, villous-pubescent on the outside, the tube clavate-infundibular, somewhat incurved, the throat yellow, the limb with its lowest lobe transversely oblong, truncate, reflexed, the rest very short.

This distinct species was based by Schauer on several collections made by Johann Emanuel Pohl (apparently under his no. 137) at Caretão, Pillão, Cruxas, and Trahiras, in Goiás, Brazil, deposited in the herbarium of the Botanisches Museum at Berlin, where one of them was photographed by Macbride as his type photograph number 17530, now destroyed. In his 1851 publication Schauer cites Martius s.n. [Contendas] from Minas Gerais, Martius s.n. [Caitete] from Bahia, and J. E. Pohl s.n. [Otho d'Agua, Alegres, Caretão, Pilar Cruxas, Trahiras]. He places the species in his Section Zapania, Subsection Paniculatae, and says: "Lippiae vernonioidi Cham. proxime affinis et valde similis, bracteārum figura potossimum diversa." Of the inflorescence he says: "Paniculae rami saepius simplices sunt, quo illa racemosa evadit, capitulis ad apicem compactis plerumque vero pedunculis unus alterve progreditur ad basin capituli terminalis, tunc alaris et sessilibus, quo panicula dichotoma, magis minusve expansa fit." He also says "pilis in supera pagina foliorum basi callosis vel ecallosis."

The flowers are described as "rose-pink" on Mexia 5677, as "rose" on Williams & Assis 7206, as "pink" on Warming 174, as "blue" on Williams & Assis 7046, as "lilac" on E. Santos 1630, as "violet" on Mendes Magalhães 3311, and as "violet-lilac [as in Euphrasia officinalis], throat yellow" by Hiern. The plant has been found growing on campos, in low damp ground, and in cerrado, at altitudes of 590 to 1300 meters, flowering from April to July, although Schauer says "July—October". Mexia describes it as "frequent". Vernacular names are "fruta de cobra", "marmique", and "marmiqué". In all, 29 herbarium specimens and 6 mounted illustrations, including phototype material of both names involved, have been examined by me.

Citations: BRAZIL: Brasilia: Murça Pires, Silva, & Souza 9285 (Lw); E. Santos 1630 [Sacco 1863; Herb. Brad. 27093] (N). Goiás: E. Y. Dawson 14429 (Z); Glaziou 21899 (Br); J. E. Pohl 137 [Macbride photos 17530] (Kr—photo of cotype, N—photo of cotype, N—photo of cotype, N—photo of cotype, W—photo of cotype). Minas Gerais: P. Clausen 637 (S); Mendes Magalhães 3311 [Herb. Jard. Bot. Belo Horiz. 42341] (N), 3312 [Herb. Jard. Bot. Belo Horiz. 42337 & 42340] (N, N), 4323 [Herb. Jard. Bot. Belo Horiz. 45129] (N); Mexia 5677 (Au—121210, En, Gg—286681, Go, I, Ky, Mi, N, N, N, S, W—1705022); Stephan s.n. [Congonhas do Campo, 1843] (Br); Warming 174 (S), s.n. [Lagoa Santa] (N); Williams & Assis 7046 (G, N, S), 7206 (G, N). MOUNTED ILLUSTRATIONS: J. E. Pohl, Icon. Plant. Brasil. 301 (V—drawing).

LIPPIA OXYPHYLLARIA (Donn. Sm.) Standl., Field Mus. Publ. Bot. 18: 1010. 1938.

Synonymy: Lippia substrigosa var. oxyphyllaria Donn. Sm., Bot. Gaz. 23: 249. 1897.

Bibliography: Donn. Sm., Bot. Gaz. 23: 249. 1897; P. C. Standl., Field Mus. Publ. Bot. 18: 1010. 1938; Moldenke, Alph. List Common Names 7. 1939; Moldenke, Prelim. Alph. List Invalid Names 32. 1940; Moldenke in Woodson & Schery, Ann. Mo. Bot. Gard. 27: 335. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 23, 24, & 96. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Phytologia 2: 69 & 107. 1945; Moldenke, Alph. List Cit. 1: 7. 1946; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Cit. 2: 389 (1948), 3: 818 & 821 (1949), and 4: 999, 1120, & 1133. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 39, 41, & 190. 1949; Dayton, Phytologia 4: 259. 1953; Moldenke, Résumé 47, 48, 317, & 462. 1959.

Shrub or small tree, to 6.5 m. tall; trunk to 7.5 cm. in diameter; stems terete; branches terete, densely pilose; leaves decussate-opposite, petiolate; leaf-blades rather thick-textured, oblong-elliptic or elliptic to lance-oblong or lanceolate-elliptic, mostly 6—9 cm. long, acute or acuminate at the apex, acuminate or cuneate at the base, often contracted and decurrent, closely crenate along the margins, rugose, densely short-pilose and asperulous above, more densely and softly pilose beneath; secondaries and veinlet reticulation very prominent; heads usually 2 in each leaf-axil, subglobose, 2.5 cm. wide; peduncles long and recurved; heads with the rachis to 1.6 cm. long; bractlets large, broadly ovate or ovate-lanceolate, 1.6—1.8 cm. long, accrescent in age, the outer ones long-acuminate at the apex; corolla hypocrateriform, white, greenish-white, or yellow.

This species was based on two collections — one made by Henri François Pittier de Fábrega (no. 3951) at the borders of the forest at Térrabe, Puntarenas, Costa Rica, at an altitude of 800 feet, in February, 1891, and the other by Adolfe Tonduz (no. 6667) in thickets along the river Ceibo near Buenos Ayres, in the same province, at 1000 feet altitude, Costa Rica, in February, 1892. Smith (1897) compares this taxon with L. substrigosa Turcz., of which he regarded it as a variety, as follows: "The typical form of the species seems to be represented by the following specimens from Guatemala, which differ from the above by tetragonal branches, ovate leaves abruptly contracted into petiole, peduncles several in the axes, orbicular-ovate bracteoles: nos. 2006, 4387, 4389 Pl. Guat., etc., qu. ed. Sonn. Sm.; no. 3610 Nelson."

This endemic Costa Rican and Panamanian species has been found on llanos at altitudes of 240 to 1300 meters, flowering from December to March, fruiting in January, February, and April. A common name recorded for it is "caragra", erroneously listed by me previously as applying to L. substrigosa Turcz.

The flowers are described as "white" on Tonduz 6667, "greenish-white" on R. S. Williams 151, and "yellow" on P. H. Allen 1541. Material has been misidentified and distributed in herbaria as L.

substrigosa. Standley (1938) says "It is probable that most of the material reported from Costa Rica as L. umbellata Cav. is referable to this endemic species, which is distinguished from other local species by the broad heads with accrescent bracts."

In all, 13 herbarium specimens, including type material of both names involved, have been examined by me.

Citations: COSTA RICA: Puntarenas: H. Pittier 3951 (Br--cotype); Pittier & Tonduz s.n. [Herb. Inst. Physico-geogr. Nat. Costaric. 10632] (Br); Tonduz 6667 (Br--cotype, Br--cotype). PANAMA: Chiriquí: P. H. Allen 1008 (E--1121190, G, N), 1541 (G, N); H. Pittier 5387 (N); P. White 332 (G, N). Coclé: R. S. Williams 151 (N). Veraguas: P. H. Allen 155 (A).

LIPPIA PALMERI S. Wats., Proc. Am. Acad. 24: 67. 1889.

Synonymy: Lippia greggii M. E. Jones ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941. Lippia palmeri var. palmeri [Moldenke] in Shreve & Wiggins, Veg. & Fl. Son. Des. 2: 1255. 1964.

Bibliography: S. Wats., Proc. Am. Acad. 24: 67. 1889; Durand & Jacks., Ind. Kew. Suppl. 1: 250. 1903; Goldman, Contrib. U. S. Nat. Herb. 16: 362. 1916; M. Martínez, Cat. Nom. Vulg. & Cientif. Fl. Mex., [ed. 1]. 1923; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1244 & 1245. 1924; I. M. Johnst., Proc. Calif. Acad. Sci., ser. 4, 12 (2): 1152. 1924; M. Martínez, Cat. Nomb. Vulg. & Cientif. Pl. Mex., [ed. 2], 339. 1937; Moldenke, Suppl. List Common Names 16. 1940; Moldenke, Suppl. List Invalid Names 5 & 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 96. 1942; H. S. Gentry, Carnegie Inst. Wash. Publ. 527: 30, 45, 58, 59, 223, & 306. 1942; Moldenke, Alph. List Invalid Names 30 & 32. 1942; Moldenke, Phytologia 2: 107. 1945; M. Martínez, Bol. Soc. Bot. Mex. 2: 2 & 13. 1945; Moldenke, Alph. List Cit. 1: 17 & 233. 1946; Moldenke, Phytologia 2: 330. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 62 & 74. 1948; Moldenke, Alph. List Cit. 2: 474, 477, 489, & 595 (1948), 3: 786, 787, 873, 931, & 933 (1949), and 4: 1126, 1181, 1238, 1240, 1241, & 1247. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31 & 190. 1949; H. S. Gentry, Allan Hancock Pacif. Exped. 13 (2): 87, 98, 113, & 241. 1949; Shreve & Wiggins, Carnegie Inst. Wash. Publ. 591: 94. 1951; Calpouzos, Econom. Bot. 8: 222, 224, 226--228, 230, & 232, fig. 4. 1954; B. H. Johnson, Wasmann Journ. Biol. 16: 295. 1958; Moldenke, Résumé 37, 313, 316, & 462. 1959; Moldenke, Résumé Suppl. 3: 10. 1962; Moldenke in Shreve & Wiggins, Veg. & Fl. Son. Des. 2: 1255. 1964; Langman, Select. Guide Lit. Flow. Pl. Mex. 177 & 1010. 1964; Moldenke, Phytologia 12: 47, 63, 162, 164, 190, & 283. 1965.

Illustrations: Calpouzos, Econom. Bot. 8: 227, fig. 4. 1954.

A small, low, rounded, bushy, much-branched, and twiggy shrub, 0.5—2 m. tall, slender, erect, open, with a strong sage-like or pungent odor and highly odorous herbage; branches many, slender or very slender, short, irregular, tetragonal, appressed-pubescent; branchlets and twigs very numerous; nodes annulate; principal in-

ternodes 0.5—4 cm. long; leaves decussate-opposite, richly aromatic, with a strong sage-like odor; petioles filiform, 1—5 mm. long, appressed-pubescent; leaf-blades ovate or rounded-ovate to elliptic, 1—2.5 cm. long, 3—10 mm. wide, obtuse or rounded to subacute at the apex, usually decurrent into the petiole at the base, subcrenate or coarsely crenate along the margins, scaberulous or rugose above and finely substrigose, more densely appressed-pubescent and resinous-punctate beneath; midrib slender, often impressed above and prominent beneath; secondaries about 3 pairs, short, often impressed above and prominent beneath; peduncles solitary or in pairs in the leaf-axils, very short and inconspicuous, 1—3 mm. long, substrigose; spikes capitate, 4—13 (usually only 4—9) mm. long, often few-flowered and loose; bractlets often pink, decussate, the lower ones united to the middle, the upper distinct, ovate, 3—4 mm. long, acute or acuminate at the apex, densely appressed-pubescent, more or less resinous-dotted; calyx thin, not carinate; corolla white or cream-color to pale-lavender, lavender-white, or deep lavender-rose, turning yellow, pink, or rose in age, hypocrateriform, its tube about 4 mm. long, densely appressed-pubescent and more or less resinous-dotted outside, the limb about 3 mm. wide, the lobes puberulent toward the base outside, otherwise glabrous.

This species was based by Watson on three collections made by Edward Palmer (nos. 277, 643, & 644) — in whose honor it was named — at Guaymas, Sonora, Mexico; H. S. Gentry 4685 is said to be a topotype. The type of L. greggii was collected by Marcus Eugene Jones (no. 22581) also in Sonora, deposited in the Dudley Herbarium.

The species has been collected along arroyos, in basaltic clay soils on open slopes and mesas, on foothills and dry hills, arid hilltops, low hills and flats, low open ridges of granite rocks and sand, and low open dry ridges (granitic) between jungle-like sandy flats, rocky hillsides, rocky ground behind dunes, south-facing canyon slopes, and forested sandy valley bottoms. In Shreve & Wiggins (1964) its distribution is given as "In gravelly or basaltic, clay soils and rocky sand or sandy bottom soil, on dry open hills and mesas, rocky benches, and the drier lower slopes of hills, Lower Sonoran Zone, Magdalena Island and the adjacent peninsula, Baja California, to central Sonora and Sinaloa." Johnston reports it as "frequent in sandy washes or in small draws", while Carter & Ferris found it "on north-facing rocky slope with Bursera microphylla, Jatropha cuneata, Lemaireocereus thurberi, and some Pachycereus pringlei" and "on north-facing slope with Lysiloma candida, Mimosa purpurascens, Jatropha cinerea, Sapium biloculare, Jacquemontia, and Ruellia". Carter, Alexander, & Kellogg found it "among Larrea and Krameria with scattered Pachycereus, in broad arroyo in coastal area".

Gentry (1942) describes it as dominant or abundant on slopes and mesas of the thorn forest, and as "A low cespitose shrub with numerous short, slender, irregular branches. Southwest of Alamos on rol-

ling, open, sun-baked mesas it forms abundant open-spaced stands mixed with other shrubs, and the locality is redolent with the rich, aromatic odor of the herbage. The highland orégano belong to different families, though the flavor and odor of them is characteristically similar. As with the highland species, Lippia Palmeri is used by the Mexicans and Indians for seasoning meats, and is very excellent indeed." He records it from the "Thorn Forest, with maximum stature of 2—4 feet, 334 per acre, 10 miles east of Navojoa, hill slope to sandy bottom, exposure southeast, gradient 3 to 10 percent; soil rocky sand and some sandy bottom soil; elevation 500 feet." He also gives its occurrence as "708 per acre.....west exposure, gradient about 6 percent; soil gravelly" and reports it as a characteristic plant on canyon and mountain slopes in the short-tree forest. Martínez (1945) says that it is called "orégano" in the region of Miraflores, and "es planta aromatica muy apreciada como condimento. Mide de uno a dos metros, con hojas de 15 a 20 mm., con las florecillas blancas" The orégano of the Todos Santos region is Lippia formosa T. S. Brandeg. and that of Comondú and Mulegé is Aloysia barbata (T. S. Brandeg.) Moldenke. "Es objeto de exportación". Other authorities also report the use of Lippia palmeri as a potherb and the odorous herbage used as a condiment.

The species has been collected at altitudes of 50 to 665 meters, flowering from October to May and in July, fruiting in February and November. Variations in its common name are reported as "oregano", "orégano", and "origano". Calpouzos (1954) points out that this is only one of the plants called "oregano", "oregeno", "origano", or "oragano". Others are L. affinis Schau., L. formosa T. S. Brandeg., L. fragrans Turcz., L. graveolens H.B.K., L. micromera Schau., L. micromera var. helleri (Britton) Moldenke, L. origanoides H.B.K., L. palmeri var. spicata Rose, Lantana achyranthifolia Desf., L. involucrata L., L. trifolia L., Coleus amboinicus Lour., Hedeoma floribunda Standl., H. patens Jones, Hyptis albida H.B.K., H. americana (Aubl.) Urb., H. capitata Jacq., H. suaveolens (L.) Poit., Limnophila stolonifera (Blanco) Merr., Monarda austromontana Epl., Ocimum basilicum L., Origanum vulgare L., O. majorana L., Poliomintha longiflora Gray, and Salvia sp. He notes that "Oregano is becoming a popular herb in America. The botanical identity of the plants sold as oregano in the United States has been in doubt. Most of the plants belong to the genus Lippia, of the family Verbenaceae, and come from Mexico. The rest of our supply of this herb comes from Europe. These latter plants belong to the genus Origanum of the family Labiatae. Species in other genera are also called 'oregano', or some variation of this name, in many parts of the world. The term 'oregano' should not be used to refer only to a single plant species but rather to a number of species, all having in common a particular herb flavor."

The flowers of Lippia palmeri are described as white on A. Carter 260, H. S. Gentry 3007, and Hammerly 405, as "pink" on H. S. Gentry

4188 and R. V. Moran 4068, as "pale-lavender" on Carter & Ferris 3758, as "white to pale-lavender" on Carter & Ferris 4044, as "lavender-white to deep lavender-rose" on Carter, Alexander, & Kellogg 2476, and as "lavender to white, turning pink in age" on Wiggins 14432. Shreve 6130 is typical, with lovely pink bractlets, but the determination of his no. 6040 is doubtful.

Material of L. palmeri has been misidentified and distributed in herbaria under the names L. geminata H.B.K. and Hermannia pauciflora Wats. On the other hand, the T. S. Brandegee s.n. [Miraflores, Oct. 14, 1890], H. S. Gentry 4094, I. M. Johnston 4267, and Edw. Palmer 62, distributed as L. palmeri, are all var. spicata Rose, Nelson & Goldman 7220 and Wiggins 11379 are L. graveolens H.B.K., and M. E. Jones 23237 is xLantana scorta Moldenke. Carter, Alexander, & Kellogg 2476, H. S. Gentry 4188 & 4685, and M. E. Jones 24352 appear to be mixtures with var. spicata. The L. palmeri of Johnston (1924) is var. spicata.

In all, 84 herbarium specimens, including type material of both names involved, have been examined by me.

Citations: MEXICO: Baja California: T. S. Brandegee s.n. [Magdalena Bay, Jan. 12, 1889] (Ca—169676, G), s.n. [Sierra de la Trinidad, Nov. 1902] (Ca—50752, Vt); A. Carter 2667 (Ca—916209); Carter, Alexander, & Kellogg 2476, in part (Du—349124, G, Gg—381237, S); Carter & Ferris 4044 (Ca—199584, Gg); H. S. Gentry 4188, in part (Fs, G); Hammerly 405 (Du—295385, G, Gg—294852); M. E. Jones 24352, in part (A, Fs, La, N, Po—153954, Sd—25320); Rempel 44 (Ak—6651); Wiggins 11379 (Ca—758600, Du—321772), 14432 (Du—438443, G), 14443 (Du—438441, G), 15588 (G). Sinaloa: J. Gonzales Ortega 5509 (Me); M. E. Jones 23234 (Ca—400874, En—6160, Gg—172664, N, Po—153957), 23236 (Po—153956); Rose, Standley, & Rose 13500 (N). Sonora: L. H. Bailey 137 (Ba); H. S. Gentry 3007 (Ca—582019, Fs, G, Ge, Gg—295379, Me, Me, S), 4685, in part (Ge); M. E. Jones 22581 (Du—229891, G, Po—162203, Po—191073), 23231 (Au, Au, Ca—400877, En—6142, G, Gg—172663, Hp, N, Po—162202); Edw. Palmer 277 (C—cotype, G—cotype, Pa—cotype), 643 (C—cotype, Pa—cotype), 644 (C—cotype, Ca—168509—cotype, G—cotype, Pa—cotype); Rose, Standley, & Rose 12712 (N); Shantz s.n. [8 Dec. 1931] (I); Shreve 6040 (Fs), 6130 (Cm, Fs); Wiggins 6347 (Ca—527859, Du—226237, Mi). TIBURÓN ISLAND: R. V. Moran 4068 (Ca—1740, Du—363326). SAN MARCOS ISLAND: R. V. Moran 3982 (Ca—1381, Du—361716). CARMEN ISLAND: Carter & Ferris 3758 (Ca—199589, Z). TRES MARIAS ISLANDS: Maria Magdalena: T. S. Brandegee s.n. [Jan. 12, 1889] (Du—205074).

LIPPIA PALMERI var. SPICATA Rose ex Vasey & Rose, Contrib. U. S.

Nat. Herb. 1: 75. 1890.

Synonymy: Lippia palmeri spicata Rose, Contrib. U. S. Nat. Herb. 5: 227. 1899.

Bibliography: Vasey & Rose, Contrib. U. S. Nat. Herb. 1: 75. 1890; Rose, Contrib. U. S. Nat. Herb. 5: 227. 1899; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1245. 1924; I. M. Johnst., Proc. Calif. Acad. Sci., ser. 4, 12 (2): 1152. 1924; Moldenke, Suppl. List Common Names 16. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17 & 96. 1942; Moldenke, Phytologia 2: 107 (1945) and 2: 330. 1947; Moldenke, Castanea 13: 113 & 114. 1948; Moldenke, Alph. List Cit. 2: 474, 483, 593, & 595 (1948), 3: 933 (1949), and 4: 1121, 1126, 1235, 1236, 1242, 1244, & 1298. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 34, & 190. 1949; Calpouzos, Econom. Bot. 8: 228 & 230. 1954; Moldenke, Résumé 37, 40, & 462. 1959; Moldenke, Phytologia 12: 47, 162, 164, 190, & 283. 1965.

This variety differs from the typical form of the species in having its flower spikes 1—2.5 cm. long, more compact and conspicuous.

The plant is a twiggy bushy shrub or a small divaricately branched shrub, 1—1.5 m. tall; branches many, slender; corolla pink or lavender-white to deep lavender-rose. Rose (1890) says that "The flowers are arranged in spikes sometimes over an inch long and the whole inflorescence is more compact. It is called 'origaro' and is used in cooking much as thyme and sage is used in the United States, especially with fish and sausage, and sometimes in place of tea."

The type of this poorly defined variety was collected by Edward Palmer (no. 62) at La Paz, Baja California, Mexico, between January 20 and February 5, 1890, and is deposited in the United States National Herbarium at Washington as sheet number 46706.

The plant has been found in arid gravel soil in small tributary arroyos, on sandy forested valley bottoms, and along dry washes, wash banks, and the margins of paved highways, flowering from December to April and in June and July, fruiting in December, February, March, June, and July. Johnston refers to it as "frequent in sandy washes or small draws"; Carter, Alexander, & Kellogg found it "among Larrea and Krameria with scattered Pachycereus in broad arroyo in coastal mesa." Gentry reports it as "uncommon", used for seasoning and the highly odorous herbage used as a condiment. Common names recorded for it are "oregano", "orégano", and "origaro", but Calpouzos (1954) lists numerous other species in this and related groups to which these names are also applied -- for a list of these, see under the typical form of L. palmeri.

In Shreve & Wiggins (1964) the distribution of this variety is given as "In habitats similar to those of var. palmeri, Lower Sonoran Zone, in Baja California, Tiburón Island, and Sonora". Johnston (1924) says: "This is a frequent plant about Willards Point (4267) and along the southeast shore of Tiburón Island. It is a characteristic shrub on rocky benches and on the drier, lower slopes of the

hills, and forms a rounded bushy mass of many slender twiggy stems 6--10 dm. high. The collected specimens seem to have slightly smaller, less rugose, and less crenate leaves than do the other available collections of this species." Still he regarded his collection to represent the typical form of the species.

Material has been misidentified and distributed in herbaria under the names Lippia montana T. S. Brandeg. and Lantana sp. The Carter, Alexander, & Kellogg 2476, H. S. Gentry 4188 & 4685, and M. E. Jones 24352 appear to be mixtures with the typical form of the species.

In all, 34 herbarium specimens, including type material of all the names involved, and 2 mounted photographs have been examined by me.

Citations: MEXICO: Baja California: T. S. Brandegee s.n. [Miraflores, Oct. 14, 1890] (Ca--187476); Carter, Alexander, & Kellogg 2476, in part (Mi); H. S. Gentry 4094 (Ca--709115, Du--264840, G), 4188, in part (Ca--709158, Du--264882); M. E. Jones 24351 (La, Po--153955, Rs--11734, W--1635664), 24352, in part (Ca--400428, N), 24355 (Po--83959); Edw. Palmer 62 (Pa--isotype), 621 (G); Shreve 7184 (Du--263426, Fs, G, Mi, N); J. Whitehead 820 (Du--248580, La, N--photo, Z--photo); Wiggins 5539 (Du--263465), 14614 (Du--438442, G). Sonora: H. S. Gentry 4685, in part (N). TIBURÓN ISLAND: I. M. Johnston 4267 (A, Ca--251803, Du--166612, Du--188791, G, Gg--31206, N).

LIPPIA PEARSONI Moldenke, Phytologia 3: 120--121. 1949.

Bibliography: Moldenke, Phytologia 3: 120--121 & 137. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 119 & 190. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 147 & 462. 1959; Moldenke, Phytologia 12: 232. 1965.

Shrub, 1.5--2 m. tall, many-stemmed, much-branched; stems suffrutescent, erect; branches rather stout, somewhat angular and ribbed, densely puberulent; branchlets and twigs usually ternate, slender, minutely puberulent or glabrescent, often ribbed; nodes not annulate; principal internodes 1--6.7 cm. long; leaves mostly ternate, very aromatic; petioles slender, 1--5 mm. long, pilosulous-puberulent; leaf-blades chartaceous, rather uniformly green on both surfaces, small, narrow-elliptic or lanceolate, 2--7 cm. long, 5--15 mm. wide, attenuate at both ends, very finely and rather obscurely serrulate along the margins, finely strigose and scabrous above, densely punctate beneath and strigose along the larger venation; midrib slender, subimpressed above, prominent beneath; secondaries very slender, 5--9 per side, ascending, slightly arcuate, subimpressed above, promimulous beneath; veinlet reticulation subimpressed above, only the larger parts distinct beneath; inflorescence axillary, spicate, usually 4--8 per node, the floriferous portion oblong, densely many-flowered, to 15 mm. long; peduncles slender, 5--13 mm. long, appressed-puberulent; bractlets ovate, about 2 mm. long and wide, acute at the apex, densely puber-

ulent and resinous-granular; corolla white, hypocrateriform, barely surpassing the bractlets, the limb about 2 mm. wide, densely puberulent on the outside.

The type of this species was collected by Henry Harold Welch Pearson (no. 2673) -- in whose honor it was named -- in open places between Chibia and Quihita, southern Angola, on May 13, 1909, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The collector notes that the stems and leaves are fragrant, and that the plant is common. Gossweiler found it at 1000 meters altitude. Material has been misidentified and distributed in herbaria under the name L. asperifolia Marthe.

In all, 9 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: ANGOLA: Huíla: Antunes or Dekindt 710 (Ul), s.n. (Ul); C. Henriques 149 (Ul). Mossamedes: Gossweiler 13439 (Ul, Ul, Ul); E. J. Mendes 61 (Ul). Province undetermined: H. H. W. Pearson 2673 (F--photo of type, K--type, N--isotype, N--photo of type, Sg--photo of type, Z--photo of type).

LIPPIA PEARSONI var. SESSILIS Moldenke, var. nov.

Haec varietas a forma typica speciei foliis sessilibus reflexis recedit.

This variety differs from the typical form of the species in having its leaves sessile and reflexed.

The type of this variety was collected by Teixeire & Andrade (no. 6652) at Caputo, altitude 1700 meters, Huambo, Angola, on May 9, 1962, and is deposited in the herbarium of the Centro de Botânica, Junta de Investigações do Ultramar, Lisbon. The collectors note that "Planta de base anual, raiz rizomatosa. Caules quadrangulares, dum verde amarelado. Flores e estames cremas. Anteras roxas. Toda a planta revestida de um indomento" and record the common name "ondembe itito". It is known thus far only from the type specimen.

Citations: ANGOLA: Huambo: Teixeira & Andrade 6652 (Ul--type).

LIPPIA PEDUNCULATA H. H. W. Pearson, Trans. S. Afr. Phil. Soc. 15: 175--176. 1905.

Bibliography: H. H. W. Pearson, Trans. S. Afr. Phil. Soc. 15: 175--176. 1905; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Phytologia 5: 26. 1954; Moldenke, Résumé 154 & 462. 1959; Moldenke, Phytologia 12: 231 & 232. 1965.

A woody perennial; branches erect, subterete, striate, hispid-scabrid; leaves decussate-opposite, very short-petiolate; petioles about 2 mm. long; leaf-blades ovate or elliptic-ovate, 3--5 cm. long, 1--1.5 cm. wide, obtuse or subacute at the apex, narrowed at the base, crenate-serrate along the margins, rugose, roughly hispidulous above, hispid on the venation beneath, profusely glandular-dotted; spikes at first globose, later cylindric, axillary, solitary or paired; peduncles long, slender, hispid; bractlets broadly oblong, 3--4.5 mm. long, 2--2.5 mm. wide, abruptly acuminate or caudate-

acuminate at the apex, truncate at the base, hispid on both surfaces and especially along the margins, not surpassing the flowers; calyx conspicuously 2-lobed, 1.5—2 mm. long, 4-veined, softly villous on the outer surface, the lobes almost as long as the tube, each 2-veined and more or less obscurely 2-dentate; corolla hypocrateriform, 4—5 mm. long, villous above the middle on the outside, puberulous in the throat.

The type of this species was collected by J. H. McLea (no. "34" or "321") somewhere in the Transvaal, South Africa, the precise locality not indicated on the label, and is deposited in the Bolus Herbarium. Pearson (1905) says: "L. pedunculata has affinities both with L. scaberrima and L. asperifolia, being apparently more closely allied with the former. The most marked characters which separate it from L. scaberrima are found in the 4-toothed calyx, the smaller bracts, the more pronounced hairiness, and the comparatively smoother surface of the whole plant. From L. asperifolia it differs in the 4-toothed calyx, the larger bracts and spikes, and the less hairy, rougher, and larger leaves."

The Repton 1722, distributed as L. pedunculata, is actually L. pretoriensis H. H. W. Pearson. I know nothing of L. pedunculata beyond what is given in the bibliography and have as yet seen no material of it.

LIPPIA PEDUNCULOSA Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906.

Synonymy: Lippia pulchella Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96, nom. nud. 1942. Lippia pedunculosa Moldenke, Alph. List Invalid Names Suppl. 1: 15, sphalm. 1947.

Bibliography: Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906; Prain, Ind. Kew. Suppl. 4: 142. 1913; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Cit. 1: 222. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 15. 1947; Moldenke, Phytologia 2: 385. 1947; Moldenke, Alph. List Cit. 3: 695 & 900 (1949) and 4: 1296. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Résumé 94, 316, & 462. 1959.

Bush, to 3 m. tall; branches and branchlets slender, buff-colored, acutely or obtusely tetragonal, nitidulous, minutely puberulent, becoming glabrous (except at the nodes), twiggy; leaves decussate-opposite, very numerous, mostly with fascicles of smaller ones in their axils; petioles slender, 1—7 mm. long, sparsely strigillose; leaf-blades subchartaceous, narrow-lanceolate, 0.4—4 cm. long, 2—9 mm. wide, acute at the apex, regularly dentate from near the base to the apex with small acute or blunt appressed or slightly divergent teeth, acute at the base, rather sparsely strigose with bulbous-based hairs above, short-pubescent or strigose-puberulent beneath and densely resinous-punctate, rough above (especially in age); inflorescence axillary, abundant, solitary, opposite, erect or ascending, surpassing the subtending leaves; peduncles very slender, 1.5—7 cm. long, sparsely and obscurely puberulent; heads incanous throughout, 4—8 mm. long, 4—5 mm. wide, uniform in width through-

out; corolla hypocrateriform, pink or pinkish-violet, sometimes white.

The type of this very distinctive species and also of L. pulchella was collected by George Gardner (no. 1386) on shelving gneiss rock along and about 80 miles up the Rio São Francisco, Alagoas, Brazil, in March, 1838; that of Hayek is deposited in the herbarium of the Naturhistorisches Museum at Vienna, where it was photographed by Macbride as his type photograph number 34326; that of L. pulchella is deposited in the herbarium of the Royal Botanic Gardens at Kew. Schery found the species growing in subxerophytic, rocky, sandy soil, flowering in January.

In all, 9 herbarium specimens, including type material of all the names involved, and 5 mounted photographs have been examined by me.

Citations: BRAZIL: Alagoas: G. Gardner 1386 [Macbride photos 34326] (Cb--isotype, Cb--isotype, It--isotype, It--photo of type, K--isotype, Kr--photo of type, M--isotype, N--isotype, N--photo of type, N--photo of isotype, S--isotype, Z--photo of isotype); Netto s.n. (Ja--46552). Bahia: Schery 504 (N).

LIPPIA PENDULA Rusby, Bull. N. Y. Bot. Gard. 8: 116. 1912.

Bibliography: H. H. Rusby, Bull. N. Y. Bot. Gard. 8: 116. 1912; Prain, Ind. Kew. Suppl. 5: 153. 1921; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 40, & 96. 1942; Moldenke, Lilloa 12: 148. 1946; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 46. 1947; Moldenke, Alph. List Cit. 2: 486 & 626 (1948) and 3: 844. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81, 97, & 190. 1949; Moldenke, Phytologia 5: 96. 1954; Moldenke, Résumé 94, 114, & 462. 1959; Maria, Fl. Vall. Coch. 38. 1962; Moldenke, Résumé Suppl. 10: 3. 1964; Moldenke, Phytologia 12: 47, 170, & 203. 1965.

A slender bush or shrub, to 2.5 m. tall, velvety-hairy throughout; branches long, slender, strongly ascending, somewhat tetragonal; petioles stout, to 15 mm. long; leaf-blades thick-textured, dark-green above, gray beneath, oval or ovate, 1.5--6 cm. long (or longer), 0.8--3 cm. wide, subacute at the apex, rounded to subcordate at the base, finely crenate along the margins, the upper surface finely bullate, the slender yellow midrib and secondaries prominent beneath; inflorescence axillary; peduncles slender, about 8 mm. long, clustered, pilose, some pendulous; heads 5--6 mm. wide, some a little longer than wide; bractlets broadly ovate, closely imbricate, acute at the apex; flowers about 5 mm. long; calyx ovoid, half as long as the corolla-tube, pilose on the outside, the triangular teeth very small; corolla hypocrateriform, pilose, the tube slender, purple, abruptly swollen just above the middle, then again contracted, the limb yellow, abruptly expanded, about 2 mm. wide, the lobes rounded; stamens inserted in the swollen part of the corolla-tube.

This species is based on a specimen collected by Robert Statham Williams (no. 307) at Apolo, La Paz, Bolivia, at an altitude of 4800 feet, on February 27, 1902, and is deposited in the Britton

Herbarium at the New York Botanical Garden. Rusby (1912) says: "No. 96, from the same locality, Feb. 23, is the same, as is No. 162, from the same locality, collected April 16, the leaves larger than those of the others. Species very near L. origanoides H.B.K."

The species has been found growing on campos at altitudes of 720 to 1600 meters, flowering in February and April. In the Instituto Miguel Lillo the original publication is cited as "Rusby, Bolivia (1912) 116". Maria (1962) cites his no. 117/3c from Cochabamba, Bolivia. The Kuntze s.n. [Sta. Cruz, 1000 m., V.92], distributed as L. pendula, is actually L. affinis Schau., while Julio II.138 is L. suffruticosa (Griseb.) Kuntze.

In all, 8 herbarium specimens have been examined by me, including the type.

Citations: BRAZIL: Minas Gerais: Regnell 38 (Ja--32322). Paraná: Dusén 14929 (W--1481644), 16591 (W--1481645). BOLIVIA: La Paz: R. S. Williams 96 (N, W--1159330), 162 (N), 307 (N--type, Z--isotype).

LIPPIA PHAEOCEPHALA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1158--1159. 1904.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1158--1159. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 494. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96. 1942; Moldenke, Lilloa 8: 425 (1942) and 10: 379. 1944; Moldenke, Alph. List Cit. 1: 264 (1946) and 3: 693. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99 & 190. 1949; Moldenke, Phytologia 3: 289. 1950; Moldenke, Résumé 117, 119, & 462. 1959; Troncoso, Darwiniana 12: 258, 259, & 275--277, fig. 10. 1961; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Moldenke, Phytologia 12: 24 & 90. 1965.

Illustrations: Troncoso, Darwiniana 12: 277, fig. 10. 1961.

A dioecious medium-sized subshrub, to 0.6 m. tall; stems erect, thickened at the base, branched, glabrescent in age; branches ascending, greenish, tetragonal, sparsely strigose with antrorse hairs and also spreading glandular-pilose; middle internodes 4--10 cm. long; leaves decussate-opposite, subsessile; petioles slender, 3--8 mm. long, strigose and spreading glandular-pilose like the branches; uppermost leaf-blades narrowly lanceolate and subentire, the rest lanceolate or oblong-lanceolate, to 7 cm. long and 1.7 cm. wide, narrowly short-acuminate or almost apiculate at the apex, lightly long-convex along the margins, extenuated at the base, green on both surfaces, somewhat rigid, roughened on both surfaces with a few antrorse strigose hairs, rather conspicuously few-dentate toward the apex, the teeth 0.1--0.8 mm. long and 5--8 mm. apart, the venation rather regularly pinnate, hardly at all or but slightly impressed above, conspicuous but hardly prominulent beneath; inflorescence axillary; peduncles slender, elongate, 3--5 cm. long, shorter than or subequaling the subtending leaves, glandular-pilose, with only a few or very few strigose hairs; heads cinereous, subcylindric-globose, about the size of a drupe of Prunus

spinosa L., 8—10 mm. long and 7—8 mm. wide during anthesis; bractlets broadly ovate, about 4 mm. long and 3 mm. wide, acuminate at the apex, densely imbricate, antrorsely strigose on the outer surface with long and numerous hairs, about equaling or slightly surpassing the flowers, the lower ones larger, all accrescent after anthesis; calyx very minute during anthesis, campanulate, less than 0.5 mm. long, obscurely 2-lipped, the lips subentire; corolla hypocrateriform, lemon-yellow or orange, minute, puberulent above on the outside, the tube cylindric, exserted, the limb 4-lobed, the lobes small, ovate, the anterior one larger; stamens and pistil included, normal for the genus; fruiting-heads 10—12 mm. long and 10 mm. wide; mericarps about 1.5 mm. long and 1 mm. wide, smooth, the inner face excavated, accompanied by the noticeably pubescent calyx-segments when shed.

This species was based by Briquet on two collections made by Emil Hassler in Paraguay -- one (no. 6798a) collected on a campo near Chololo, in the valley of the Río Y-acá, in December, and the other (no. 7456) collected on a campo near Concepcion, in September, both deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where the latter was photographed by Macbride as his type photograph number 24659. Troncoso (1961) excludes no. 7456, which she says is L. asperrima Cham., and regards no. 6798a as lectotype of L. phaeocephala, citing the Geneva specimen not as yet seen by me.

Briquet (1904) says: "Cette jolie espèce est voisine du L. turnerifolia; elle s'en distingue par les glandes stipitées assez abondantes mêlées aux poils strigueux plus rares et l'absence d'indument hirsute, par la forme plus cylindrique de ses capitules à bractées plus amplement ovées sous l'acumen, la forme et le mode de serrature des feuilles etc. Le sommet de l'axe, dépassé par les derniers pédoncules axillaires, est rendu complètement blanc par les poils strigueux très serrés qui le recouvrent. Le L. Morongii O. K. (L. angustifolia Morong non Cham.) s'en distingue facilement par l'absence d'indument glanduleux, les feuilles caulinaires plus longuement acuminées au sommet et les capitules dépourvues de l'indument cendré-gris caractéristique pour le L. phaeocephala. D'ailleurs, dans le L. phaeocephala les pédoncules atteignent souvent la longueur des feuilles, tandis qu'ils sont notablement plus courts dans le L. Morongii, ce qui entraine un port assez différent."

In all, 6 herbarium specimens, including material of the lectotype, and 4 mounted photographs have been examined by me.

Citations: PARAGUAY: Hassler 7456 [Macbride photos 24659] (It—photo of lectotype, Kr—photo of lectotype, N—lectotype, N—photo of lectotype, W—photo of lectotype). URUGUAY: Arechavaleta 14 (Ug); Legrand 2570 (Ug), 3489 (N, Ug), 3490 (Ug).

LIPPIA PHRYXOCALYX Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1161—1162. 1904.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1161—1162. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 497. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96. 1942; Moldenke, Lilloa 8: 425 (1942) and 10: 379. 1944; Moldenke, Alph. List Cit. 1: 264. 1946; Moldenke, Phytologia 2: 385 & 386. 1947; Moldenke, Lilloa 14: 44. 1948; Moldenke, Alph. List Cit. 2: 553 (1948), 3: 689 (1949), and 4: 1165. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81, 99, & 190. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 349. 1951; Moldenke, Résumé 94, 117, & 462. 1959; Troncoso, Darwiniana 12: 258, 291, & 292, fig. 18. 1961; Moldenke, Phytologia 12: 24, 242, & 252. 1965.

Illustrations: Troncoso, Darwiniana 12: 292, fig. 18. 1961.

Shrub, to 2 m. tall; bark on the older branches brown, on the younger ones green, sometimes becoming purplish; branches obtusely tetragonal or hexagonal, shortly glandular-pilose throughout; middle internodes 3—4 cm. long; leaves decussate-opposite or ternate, very shortly subpetiolate; petioles only 2—3 mm. long; leaf-blades rather rigid, dark-green above, pale-green beneath, ovate-elliptic, 3—4 cm. long, 2—2.5 cm. wide, acute or shortly subacuminate at the apex, often more convex along the margins below the middle, regularly crenate-dentate along the margins, rounded-extenuate at the base, scabrid and also glandular-punctate above, very shortly glandular-pilose beneath, the teeth numerous, often mucronate, 0.5—1 mm. long, 2—3 mm. apart, the venation reticulate, more or less impressed above, prominulous beneath; inflorescence axillary or often supra-axillary, spicate, pedunculate; peduncles 1.5—2.5 cm. long, shorter than the subtending leaves, densely glandular-pilose; spikes short, lax, alternate-flowered, at first hemispheric and head-like, 1 cm. long and 1—1.3 cm. wide, later elongate and spike-like, to 2.5 cm. long, the rachis densely glandular-pilose; flowers finally rather lax, short-pedicellate; bractlets rather large, oblong-elliptic or oblong to lanceolate, membranous, loose, to 8 mm. long and 2 mm. wide, somewhat venose, colored, often becoming purple, acute or short-acuminate at the apex, plicate, shortly glandular-pilose on the outer surface; calyx short-pedicellate, ovate-campanulate, to 2 mm. long in anthesis, somewhat 2-lipped or bilabiate-bifid, the lips subentire or 4-dentate, hirtous or long-hirsute on the outer surface with spreading white hairs and also glandular-punctate; corolla hypocrateriform, surpassing the subtending bractlets, rose or clear-rose to light reddish-violet or light-violet, surpassing the calyx-mouth by 8 mm., puberulent above, to 11 mm. long, the tube exserted, 7—8 mm. long, slender at the base, gradually somewhat ampliate upwards, the throat the same color as the limb or white, the limb spreading, to 12 mm. wide, the upper lobes connate for a long distance, the lateral ones rounded, the anterior one larger and obcordate, the upper and lateral ones to 1 mm. long, the anterior one about 1.5 mm. long and 1.9 mm. wide; stamens and pistil included, normal for the genus; mericarps oblong, about 2.3 mm. long and 1 mm. wide, smooth, accompanied by the densely long-hirsute calyx-segments when shed; rachis after the shedding of the

fruit to 4.5 cm. long, roughened by the persistent elongate pedicels.

The type of this very distinctive species was collected by Emil Hassler (no. 7896) in November in thickets in the region of the upper Río Apa, Paraguay, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva; an isotype deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed, was photographed by Macbride as his type photograph number 17531.

The species has been found growing in the shade of thickets, on high plateaus, on mountains, and on mountainsides in the true caatinga formation, flowering in May, July, November, and December. Material has been misidentified and distributed in herbaria as L. lasiocalycina Cham. and as Verbena sp.

Briquet (1904) says: "Espèce de premier ordre, sans affinité avec aucune de celles de la section Euzapania. La forme des feuilles, la glandulosité, les capitules s'allongeant pendant l'antèse, et l'indument remarquable du calice rapellent de L. lasiocalycina Cham. placé par Schauer parmi les Euzapania. Mais le L. phryxocalyx ne montre pas l'etat aphylle à inflorescence densément racemiforme décrit par Chamisso et figuré par Schauer (in Mart. Fl. brasil., vol. IX, tab. 39); sa biologie végétative est tout autre. En outre, le L. phryxocalyx s'écarte du type boliviano-brésilien par ses feuilles crénelées-dentées, fermes, à créneaux nombreux et serrés et par l'absence de coussinets d'insertion volumineux, mamelonnés et laineux pour les pédoncules."

Troncoso (1961) says: "Especie muy característica, sin estrecha afinidad con ninguna otra de la sección Lippia. Para ubicarla dentro del sistema he debido fundar una nueva sección: Pseudoalcysia, cuyes caracteres principales se detallan al principio de esta nota....Frutices, spicis brevibus laxis, pedunculatis, axillaribus, insertione saepe a petiolo distanti (supra-axillari), bracteis lanceolatis, pro rata magnis, coloratis, floribus breviter pedicellatis, calyce hirto, bilabiato-bifido, 4-dentato."

It is very possible that L. lasiocalycina var. sainthilairei Moldenke belongs here.

In all, 15 herbarium specimens, including type material, and 7 mounted photographs have been examined by me.

Citations: BRAZIL: Maranhão: Eiten & Eiten 4037 (W--2445210), 4506 (W--2445198). Matto Grosso: F. C. Hoehne Com. Rondon 2839 (N). Piaui: Eiten & Eiten 4914 (N). PARAGUAY: Anisits 2736 (S), 2742 (S); Fiebrig 4956 (Bm); Hassler 7896 [Macbride photos 17531] (Ca--944347--isotype, It--photo of isotype, Kr--photo of isotype, N--isotype, N--isotype, N--photo of isotype, S--isotype, W--photo of isotype), 10630 (A); T. Rojas s.n. [Hassler 10630; "630"] (N, N, S).

LIPPIA PICKELII Moldenke, Lilloa 5: 424--425. 1940.

Bibliography: Moldenke, Lilloa 5: 424--425. 1940; Moldenke,

Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96. 1942; Moldenke, Alph. List Cit. 1: 264. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 76. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99 & 190. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 117 & 462. 1959.

Perennial herb, woody at the base; stems and branches very slender, rather densely hispidulous with whitish erect hairs on the younger parts, more sparsely so in age; leaves decussate-opposite; petioles slender, hispidulous with erect white hairs 1—2 mm. long; leaf-blades chartaceous, elliptic or ovate, 2.5—6.5 cm. long, 1—3 cm. wide, acute or obtuse (in outline) at the apex, acute or acuminate at the base, regularly serrate from near the base to the apex with very small blunt antrorse teeth, strigose or hispidulous on the lamina (not the venation) above with whitish bulbous-based hairs, strigose on the venation with non-bulbous hairs beneath; inflorescence axillary, much shorter than the subtending leaves, ascending, solitary, opposite, 8—13 mm. long; peduncles very slender, 3—5 mm. long, hispidulous.

The type of this species was collected by Emil Hassler (no. 11040) in limestone areas along the upper course of the Río Apa, Paraguay, in March, 1913, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. It is named in honor of my good friend and colleague, Don Bento Pickel, of the Department of Forestry in São Paulo, who has contributed so much to our knowledge of the flora of Pernambuco and São Paulo. The species is known thus far only from the type collection. In all, 5 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: PARAGUAY: Hassler 11040 (Cb—type, K—isotype, N—isotype, N—photo of type, N—photo of isotype, S—isotype, V—isotype, Z—photo of type, Z—photo of isotype).

LIPPIA PLICATA J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 281. 1900.

Synonymy: Lippia adoënsis var. multicaulis Hiern, Cat. Afr. Pl. Welw. 1 (4): 829—830. 1900. Lippia strobiliformis Moldenke, Phytologia 2: 317. 1947.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 281. 1900; Hiern, Cat. Afr. Pl. Welw. 1 (4): 829—830. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; R. Good, Journ. Bot. 68, Suppl. 2: 139—140. 1930; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 50, 51, 95, & 96. 1942; Moldenke, Phytologia 2: 317 & 341. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 115, 117, 119, & 189—191. 1949; Moldenke, Alph. List Cit. 3: 978 (1949) and 4: 1201, 1202, & 1220. 1949; Moldenke, Phytologia 3: 137 (1949), 3: 292 & 293 (1950), 3: 456 (1951), and 4: 190. 1953; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Brenan, Mem. N. Y. Bot. Gard. 9: 36. 1954; Moldenke, Résumé 142, 145, 147—149, 310, 462, & 463. 1959; Moldenke, Phytologia 12: 42, 106, 231, 264, & 307. 1965.

Slender sparsely branched shrub, 0.5—2.3 m. tall, or herba-

ceous, with a mint odor; stems slender, tetragonal, ridged and sulcate, strigillose; branches few, woody, short, densely pubescent; nodes not annulate; principal internodes 3.5—6 cm. long; leaves decussate-opposite, short-petiolate, very fragrant; petioles slender, 2—5 mm. long, strigose; leaf-blades firmly chartaceous, green or grayish-green on both surfaces, ovate or lanceolate to elliptic, 3—6 cm. long, 1—2 cm. wide, often plicate, acute at the apex, regularly serrulate or crenate along the margins, acute at the base, scabrous or very scabrous and slightly subbullate above, puberulent or densely pubescent and resinous-granular beneath; midrib slender, subprominulous above, prominulous beneath; secondaries slender, 6—8 per side, ascending, only slightly arcuate, subimpressed above, prominulous beneath; vein and veinlet reticulation subimpressed above, subprominulous beneath; inflorescence axillary or forming a terminal panicle, spicate-strobiliform, 2 per node, abundant; peduncles slender, firm, ascending, 1—3.8 cm. long, tetragonal, strigillose; spikes very densely capitate, oblong, 2—3.8 cm. long, about 1.5 cm. wide; bractlets large and conspicuous, very numerous, green, very closely imbricate and appressed antrorsely, ovate, 4—7 mm. long, 4—5 mm. wide, acute or abruptly acute to subacuminate at the apex, very densely appressed-pubescent with antrorse hairs which project prominently beyond the margins and form what appears macroscopically like a light border to the bractlets; flowers very fragrant, showy; corolla hypocrateriform, white or cream-color, with a yellow throat, its tube cylindric, 4—8 mm. long, densely puberulent on the outside, the limb about 4 mm. wide, its lobes small and orbicular.

This handsome species was based on two collections made by Carson (nos. 81 & 128) at Fwambo, Urungu, Northern Rhodesia. The type of L. strobiliformis was collected by Captain Storms (no. 3) at Karema, Tanganyika, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. L. adoënsis var. multicaulis is based on three collections made by Friedrich Martin Josef Welwitsch (nos. 5667, in part, 5690, in part, & 5733 in Angola.

The long slender roots of this plant are remarkable because of the large number of sessile nodules of presumably nitrogen-fixing bacteria which they bear, the nodules being 2—4 mm. in diameter. The flowers are described as "white" on A. Lea L.R. 50, Mullenders 2373, Quarré 2960, and Teixeira & al. 5341, as "cream" on Teixeira & Andrade 6654, and as "white, throat yellow" on Brass 16927. The plant has been found growing in herbaceous or shrubby savannas, in sandy soil, in old cultivations, and on the foothills of mountain ranges, at altitudes of 520 to 1700 meters, flowering in February, March, and June to August, fruiting in November. Brass found it "frequent in Brachystegia woodland", Teixeira describes it as "frequent and abundant in cultivated and abandoned soil", while Teixeira & Andrade say of it "planta de base vivaz de 50 cms. a 1,5 m. de altura; multicaule,

de um verde claro e de folhas rogosas; flores cremes; toda a planta de um cheiro muito agradável; pouca frequente nos terranos da Chianga". Vernacular names recorded for it are "mangue", "ondenbe", and "tschikoitsch".

Material has been misidentified and distributed in herbaria under the names Lantana salviaefolia Jacq. and L. salviifolia Jacq. On the other hand, the A. Peter 17145, distributed as Lippia plicata, is actually L. schliebeni Moldenke.

Baker (1900) separates the 8 tropical African species of Lippia known to him as follows:

1. Bractlets orbicular, obtuse at the apex.
  2. Peduncles very short.....L. oatesii.
  2a. Peduncles long.....L. radula.
1a. Bractlets cuspidate at the apex.
  3. Leaves small.
    4. Leaves orbicular to obovate.....L. somalensis.
    4a. Leaves oblong, rugose.....L. javanica.
  3a. Leaves larger, oblong or oblanceolate-oblong, scarcely rugose.....L. abyssinica.
1b. Bractlets acuminate at the apex.
  5. Leaves decussate-opposite.....L. ukambensis.
  5a. Leaves ternate.....L. burtonii.
1c. Bractlets acute at the apex.....L. plicata.

In all, 33 herbarium specimens, including type material of most of the names involved, and 13 mounted photographs have been examined by me.

Citations: CONGO LEOPOLDVILLE: Callens 1280 (N); Charyois s.n. [1899] (Br); Claessens 574 (Br, N); Descamps s.n. [Juin 1895] (Br); Hecy s.n. [Albertville, Juin 1899] (Br); Herb. Com. Spec. Katanga 78 (Br); Kevers 12 (Br); Mullenders 2373 (Br); Quarré 2960 (Br, N). TANGANYIKA: E. M. Bruce 34 (F--photo, K, N, N--photo, Sg--photo, Z--photo); A. Lea L.R.50 (Af, Rh); Nutt s.n. (K); A. Peter 31959 [V.63] (B); Pielou 100 (S); Storms 3 (Br, Br, Br, F--photo, K--photo, N--photo, Si--photo, Z--photo). ANGOLA: Huambo: B. Teixeira 5341 (Ul); Teixeira & al. 5341 (Ul); Teixeira & Andrade 6654 (Ul). Province undetermined: Welwitsch 5667, in part (F--photo, K, N--photo, Sg--photo, Z--photo). MALAWI: Brass 16927 (N, W--2061898), 17370 (N, W--2062079); Smuts 2295 (Af); Stolz 686 (B, Mv); Whyte s.n. (W--550846).

LIPPIA PLICATA var. ACUMINATA (Moldenke) Moldenke, comb. nov.

Synonymy: Lippia strobiliformis var. acuminata Moldenke, Phytologia 2: 317--318. 1947.

Bibliography: Moldenke, Phytologia 2: 317--318 & 341. 1947; Moldenke, Alph. List Cit. 4: 1068, 1083, & 1084. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 115, 119, & 191. 1949; Moldenke, Résumé 142, 147, & 463. 1959.

This variety differs from the typical form of the species in having often ternate leaves and inflorescences and in having the bractlets of its dense capitate spikes wide-spreading, not appressed, lanceolate-ovate, about 1 cm. long, 4—4.5 mm. wide, long-acuminate at the apex, densely puberulent, without a light border. The mature spikes are 2 cm. wide and the peduncles are to 4.5 cm. long.

The type of the variety was collected by Père Hyacinthe Vanderyst (no. 17168) in the region of Panzi, Republic of Congo, in 1925, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels.

In all, 10 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: CONGO LEOPOLDVILLE: Vanderyst 16988 (Br), 17168 (Br--type, F--photo of type, N--photo of type, Si--photo of type, Z--photo of type), 22829 (Br), 22935 (Br), 22977 (Br, N), 23001 (Br), 23376 (Br), s.n. [Panzi, 1925] (Br). ANGOLA: Cuanza-sul: Gossweiler 9364 (W--1550202).

LIPPIA PLICATA var. PARVIFOLIA (Moldenke) Moldenke, comb. nov.

Synonymy: Lippia strobiliformis var. parvifolia Moldenke, Phytologia 2: 318. 1947.

Bibliography: Moldenke, Phytologia 2: 318. 1947; Moldenke, Alph. List Cit. 4: 1083. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 115 & 191. 1949; Moldenke, Résumé 142 & 463. 1959.

This variety differs from the typical form of the species in its smaller leaves, the petioles being 1 mm. long or obsolete, the leaf-blades elliptic, 1.5—3 cm. long, 6—14 mm. wide; inflorescences 2—4 per node, 1—5 cm. long; and the bractlets spreading or reflexed, closely imbricate but not appressed, ovate, 7—8 mm. long, 3—4 mm. wide, short-acuminate at the apex, densely appressed-puberulent, sometimes subrevolute along the margins, without a lighter border or with an obscure one.

The type of the variety was collected by Père Hyacinthe Vanderyst (no. 23423) at Mérode, Republic of Congo, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. Collectors describe the plant as 1--1.5 m. tall, with white flowers, blooming in March, April, and June. Common names recorded for it are "kiwenie" and "momunka". Quarré says: "dressée de 2/3, 30 de haut formant buisson répandu par station de 15 à 30 pieds; tige verte a côte. Flls. opposées vertes jaunes, elliptiques dentelées. Flrs. en plateau au sommet; a forte odeur de menthe." The Brédo 5112, cited below, was originally distributed as "51012", but Dr. Robyns writes me that this was an error in transcription.

In all, 20 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: CONGO LEOPOLDVILLE: Brédo 5112 (Br); De Witte 287 (Br, Br, N), 453 (Br, Br); Luxen 107 (Br, Br, N); Quarré 2960 (Br,

Br, Br, N); Robyns 1977 (Br, Br); Vanderyst 22830 (Br), 22889 (Br, N), 23423 (Br--type, F--photo of type, N--photo of type, Si--photo of type, Z--photo of type), 23427 (Br).

LIPPIA POHLIANA Schau. in A. DC., Prodr. 11: 577. 1847.

Synonymy: Lippia nepetacea Schau. in A. DC., Prodr. 11: 577--578. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 577--578. 1847; Schau. in Mart., Fl. Bras. 9: 228--229. 1851; Bocq., Adansonia 3: 244. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Invalid Names 31. 1942; Moldenke, Alph. List Cit. 1: 238. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 76. 1948; Moldenke, Alph. List Cit. 3: 686, 689, 751, & 824 (1949) and 4: 1086. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 80, 81, & 190. 1949; Moldenke, Résumé 94, 315, & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 12: 23, 275, & 289. 1965.

Much-branched shrub, to 1.5 m. tall; stems usually terminating in the almost leafless subpaniculate inflorescence-branches; branches elongate, tetragonal, verticillate, subhirsute; branchlets elongate, spreading or wide-spreading, subfastigiate, subtetragonal or tetragonal, tomentellous or subhirsute; leaves decussate-opposite or ternate, short-petiolate, spreading or reflexed, those of the branches larger, of the branchlets smaller, decreasing in size upwards, shorter than the internodes; petioles very short, often semi-amplexicaul; leaf-blades broadly rounded or subrotund to orbicular, mucronate at the apex, rounded or cordate at the base, crenate along the margins, penninerved, rugose or very rugose, villous-tomentose on both surfaces or holosericeous-tomentose above, canescent and glandulose beneath, pubescent-tomentose throughout or only on the vein reticulation beneath, more rugose and more densely tomentose on the leaves of the branches, those beneath the flowers about 2.5 cm. long, 1.6--1.8 cm. wide, the tomentum short and handsome, sometimes more dense, sometimes sparse and especially meager in the veinlet interstices on the lower surface, the 5 or 6 secondaries on each side of the midrib, as well as the veinlets, often rubescent; peduncles axillary, 2--6 per axil, weak, shorter than or subequaling the subtending leaves, about 4 mm. long, mostly reflexed and drooping, villous; heads tetraquetrous-ovoid, stramineous, 4--6 mm. long, more or less sericeous; bractlets membranous, pale, broadly ovate or subrotund-ovate, imbricate, acuminate at the apex with a spreading or recurved and complicate acumen, glandulose, shorter than the corolla-tube, the margins and keel villous or sericeous-villous; calyx short, villous, bifid; corolla hypocrateriform, white or yellow, becoming pink in age, the limb small, crisped, the upper and lateral lobes exiguous, the lower erect and quadrangular-subrotund, or the upper lobe ovate, the lower quadrate and erect, and the lateral ones small, ovate, and obtuse.

This species was based by Schauer on several collections made in Goiás, Brazil, by Johann Emanuel Pohl — in whose honor it was named — at Caldas Novas, Parapitinga, and Menaponte (no. 2791) — and on one made by Ludwig Riedel somewhere in Brazil, probably in São Paulo ["loco natali non indicata"], deposited in the De Candolle, Leningrad, and Vienna herbaria. A specimen of J. E. Pohl 141, regarded by me as another cotype, deposited in the herbarium of the Botanisches Museum at Berlin, was photographed by Macbride as his type photograph number 17532, but is now destroyed. Lippia nepetacea was based by Schauer on collections made by Pohl at Engenho do São João das Antas and at Izidro, Conceicao, also in Goiás, Brazil, and on one by Vauthier (no. 410) on desert campos of Serra do Frio in Minas Gerais. The latter was photographed by Macbride in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva as his type photograph number 7860. Both species were placed by Schauer in his Section Goniostachyum.

The species has been found growing on campos and desert campos, flowering from April to June. Mosén 4318 is very immature. Material has been misidentified and distributed in herbaria under the names L. martiana Schau., L. microphylla Cham., and L. myriantha Mart. Glaziou (1911) cites his no. 21914 under L. sericea Cham.

In all, 13 herbarium specimens and 18 mounted photographs, including type of phototype material of both names involved, have been examined by me.

Citations: BRAZIL: Goiás: J. E. Pohl 141 [Macbride photos 17532] (It—photo of cotype, Kr—photo of cotype, N—photo of cotype, N—photo of cotype, W—photo of cotype), 2791 [Menaponte, 1818] (Br—cotype, F—photo of cotype, N—photo of cotype, Si—photo of cotype, Z—photo of cotype), s.n. [Brasiliae] (Br—cotype, Br—cotype, F—photo of cotype, N—photo of cotype, Si—photo of cotype, Z—photo of cotype). Minas Gerais: Brade 13907 [Herb. Rio de Jan. 29535] (N); Glaziou 19708 (Br, Bs—21777, N), 21914, in part (Br); Mendes Magalhães 1770 [Herb. Jard. Bot. Belo Horiz. 41580] (Be—14562, N, N); Mosén 4318 (N, S); Vauthier 410 [Macbride photos 7860] (It—photo, Kr—photo, N—photo, Ug—photo, W—photo).

LIPPIA POLYTRICHA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1158. 1904.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1158. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 494. 1904; Prain, Ind. Kew. Suppl. 3: 104.1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96. 1942; Moldenke, Lilloa 8: 425 (1942) and 10: 379. 1944; Moldenke, Alph. List Cit. 1: 263 (1946) and 3: 693. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99 & 190. 1949; Moldenke, Résumé 117 & 462. 1959; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Troncoso, Darwiniana 12: 258 & 278—280, fig. 11. 1961; Moldenke, Phytologia 12:

24. 1965.

Illustrations: Troncoso, Darwiniana 12: 279, fig. 11. 1961.

Dioecious medium-sized subshrub, to 0.5 m. tall; stems incrassate, indurate, erect or ascending, coarsely spreading-hirsute throughout with white bulbous-based hairs; internodes often short or slightly elongate, the middle ones often 2—5 cm. long; leaves decussate-opposite, sessile; lowest leaf-blades broadly ovate or subrotund, the rest ovate or ovate-lanceolate, 3.5 cm. long, 1—2.5 cm. wide, obtuse or acute to shortly subacuminate at the apex, often more convex along the margins below the middle, rounded-extenuate at the base, green on both surfaces and coarsely spreading-hirsute with white bulbous-based hairs (the base conic-incrassate), rather rigid, rugose or almost bullate above, rather coarsely crenate-serrate along the margins, the teeth to 1.5 mm. long, 2—6 mm. apart, the venation simply pinnate, slightly reticulate, the lateral veins 4 or 5, medium prominulent; peduncles axillary, shorter than the leaves, 1—2 cm. long, densely spreading-hirsute throughout; heads broadly hemispheric, about 0.5 cm. long and 1 cm. wide; bractlets broadly ovate, surrounding the base of the head, about 5 mm. long and 3 mm. wide, subacuminate at the apex, long-hirsute on the outer surface, subequaling the flowers, the inner ones greatly reduced, narrower, shorter than the flowers; calyx very minute, scarcely over 0.5 mm. long, obscurely subbilabiate, with a few hairs on the outside; corolla hypocrateriform, yellow, surpassing the calyx-mouth by 3—4 mm., the tube exserted, ampliate above, the lobes ovate-rounded, puberulent on the outside, less than 1 mm. long, the anterior one larger; stamens and pistil included, normal for the genus; mature mericarps not seen.

This species was based by Briquet on two collections made by Emil Hassler in Paraguay — one, made in August (no. 4184) in fields near San Estanislao, and the other (no. 4636) made on a campo near the Río Jejuiguazu in September, both deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where the former was photographed by Macbride as his type photograph number 24660.

Briquet (1904) says: "Cette élégant espèce est encore voisine du L. turnerifolia dont elle diffère par l'abondante villosité lâche qui recouvre tout la plante, ses feuilles plus amples arrondies-sessiles à la base, les bractées beaucoup plus largement ovées, etc." Troncoso (1961) regards no. 4184 as lectotype and no. 4636 as syntype.

Thus far the species is known only from the type collections, of one of which I have examined 3 mounted photographs.

Citations: PARAGUAY: Hassler 4184 [Macbride photos 24660] (It—photo of cotype, Kr—photo of cotype, N—photo of cotype).

LIPPIA PRAECOX Mildbr. ex Moldenke, Phytologia 4: 190 & 292. 1953.

Bibliography: Moldenke, Phytologia 4: 190 & 282. 1953; Moldenke, Biol. Abstr. 27: 3121. 1953; G. Taylor, Ind. Kew. Suppl. 12: 82. 1959; Moldenke, Résumé 149 & 462. 1959.

Perennial herb, growing from a large woody underground stem often 1.5—2.5 cm. thick and 4 cm. long, apparently burned off periodically; above-ground stems several or numerous, apparently slender and short, 1—4 cm. long, simple, densely white-hirsute; principal internodes 5—10 mm. long; leaves decussate-opposite, subsessile or with carinate-winged very short petioles; leaf-blades oblong-ovate, 5—7 mm. long, 4—5 mm. wide, densely white-hirsutulous on both surfaces, obtuse or rounded at the apex, narrowed into the petiole at the base, often obscurely 3-denticulate near the apex; inflorescence axillary, capitate, decussate-opposite; peduncles filiform, 1—1.5 cm. long, densely white-hirsutulous; heads many-flowered, hemispheric; bractlets broadly ovate, about 3 mm. long and wide, acuminate at the apex, rounded or subtruncate at the base, densely whitish-hirsutulous or short-pubescent on the back, ciliate-margined; corolla hypocrateriform, 3.5—4 mm. long, the tube very narrow, the limb about 1.5 mm. wide.

The type of this curious species was collected by Adolf Ferdinand Stolz (no. 2210) at Kyimbila, at 1350 meters altitude, Malawi, in 1912, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The species is known thus far only from the original collection. In all, 4 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: MALAWI: Stolz 2210 (Af—isotype, B—isotype, N—isotype, N—photo of type, S—type, Z—photo of type).

LIPPIA PRETORIENSIS H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5 (1): 197. 1901.

Synonymy: Lantana pretoriensis H. H. W. Pearson ex Moldenke, Alph. List Invalid Names 28, in syn. 1942. Lippia crenata Pearson ex Moldenke, Résumé 311, in syn. 1959 [not L. crenata (Griseb.) Kuntze, 1898, nor Kuntze, 1904, nor Sessé & Moc., 1894].

Bibliography: H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5 (1): 197. 1901; A. W. Hill, Ind. Kew. Suppl. 6: 117. 1926; Moldenke, Alph. List Invalid Names 28. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 96 (1942) and [ed. 2], 122 & 190. 1949; Moldenke, Résumé 154, 306, 311, & 462. 1959; Moldenke, Phytologia 12: 56, 231, 235, & 236. 1965.

Erect shrub, to over 0.5 m. tall; adult stems tetragonal, striate, scabrid-pubescent, with rounded glabrescent angles; principal internodes about 6.3 cm. long; leaves decussate-opposite, aromatic, short-petiolate; leaf-blades elliptic-oblong, 5—6.3 cm. long, about 2 cm. wide, more or less narrowed at both ends, obtuse at the apex, with crenate thickened and recurved margins, scabrid-puberulous above, scabrid-pubescent on the venation beneath, glandular-punctate; secondaries 4—6 on each side, ascending, impressed above, prominent beneath; peduncles slender, terete, 4—4.5 cm. long, pubescent; spikes small, solitary, globose, 4—5 mm. wide, with a glabrous axis; bractlets broadly ovate, acuminate at the apex, truncate or subcordate at the base, 3—7-veined at the base, with a

prominent midrib, pubescent, the outer ones 5—6 mm. long and 3 mm. wide, the inner ones 3—4 mm. long and 1.5—2 mm. wide; calyx 1—1.5 mm. long, glabrous within, pubescent outside and on the rim, very shortly 2-lobed, the lobes rounded; corolla hypocrateriform, white, 2—4 mm. long, densely pubescent on the outside above the middle, glabrous within.

The type of this not very well marked species was collected by A. Rehmann (no. 4523) at Woderboom Port near Pretoria, Transvaal, in the Republic of South Africa; L. crenata is based on the same type and apparently represents Pearson's first choice as a name for the taxon until he discovered that it was invalidated by the existence of an earlier homonym.

The species has been found at altitudes of 2000 feet, flowering in February. Material has been misidentified and distributed in herbaria under the names L. pedunculata H. H. W. Pearson and Lantana salviaefolia Jacq. It should be noted here that the names Lippia crenata Kuntze and L. crenata (Griseb.) Kuntze are synonyms of L. junelliana (Moldenke) Troncoso, while L. crenata Sessé & Moc. is a synonym of L. alba (Mill.) N. E. Br.

Pearson (1901) distinguishes this taxon from some related South African species more or less as follows:

1. Calyx distinctly 2-lobed.
  2. Bractlets more than 4 mm. long and 3 mm. wide, surpassing the flowers.....L. scaberrima.
  2a. Bractlets less than 4 mm. long and 3 mm. wide, not surpassing the flowers.....L. javanica.

1a. Calyx truncate, subtruncate, or obscurely lobed.
  3. Leaf-blades serrate or crenate-serrate.
    4. Bractlets more than 4 mm. long; calyx truncate or obscurely 4-toothed.....L. wilmsii.
    4a. Bractlets less than 4 mm. long; calyx obscurely 2-lobed.....L. rehmannii.
  3a. Leaf-blades crenate.....L. pretoriensis.

Dr. Meeuse, however, in a letter to me dated September 28, 1953, comments that "I am inclined to believe that Pearson's L. rehmannii, L. wilmsii, L. bazeiana and L. pretoriensis can hardly be different from 'L. asperifolia' (=L. javanica)." In a letter dated December 9, 1953, he says "The Lippia material is extremely variable and some of Pearson's species definitely must be sunk. His calyx-character (distinctly lobed or indistinctly lobed to truncate) is useless, to my mind, so that L. wilmsii cannot on very good grounds be separated from L. scaberrima, and the three L. rehmannii-bazeiana-pretoriensis are also very close. As will be evident from many annotated specimens, several other botanists have ground their teeth on our lippias without finding any clear-cut characters."

In all, 5 herbarium specimens and one mounted photograph of the type have been examined by me.

Citations: REPUBLIC OF SOUTH AFRICA: Transvaal: Codd & Winter 4904 (Af); Junod 40 (Af); Leendertz 12366 (Af); Rehmann 4523 (N--photo of type); Repton 1722 (Af, Z).

LIPPIA PRIMULINA S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 435--437. 1895.

Bibliography: S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 435--437. 1895; Briq., Arkiv Bot. Stockh. 2 (10): 21. 1904; Durand & Jacks., Ind. Kew. Suppl. 1: 507. 1906; Moldenke, Lilloa 5: 425. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 43, & 96. 1942; Moldenke, Alph. List Cit. 1: 12 (1946) and 2: 444 & 446. 1948; Moldenke, Lilloa 14: 44. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Alph. List Cit. 3: 837 (1949) and 4: 1072. 1949; Moldenke, Résumé 94, 125, & 462. 1959; Moldenke, Phytologia 12: 256 & 268. 1965.

Plant in all not over 20 cm. tall; stems incrassate, erect, slender, about 17 cm. tall, subterete, longitudinally costate, about 2 mm. thick, few-leaved, hirsute-villosulous, finally merely pubescent, issuing from a greatly thickened rhizome which is about 1 cm. thick, brown in drying; leaves small, decussate-opposite, subsessile; leaf-blades broadly ovate, subcoriaceous, to 2.5 cm. long and 2 cm. wide, very obtuse at the apex, penninerved or palmately 7-nerved, ciliate and crenate-serrate along the margins, villous-tomentose on both surfaces, pilose at the margins beneath; peduncles erect, 2.5--4 cm. long, about half as thick as the stems, subequaling or surpassing the subtending leaves, hirsute-villosulous; heads scarcely 1.5 cm. wide; bractlets rounded-ovate, short-cuspidate at the apex, pilose-pubescent on both surfaces, the outer ones about 1.1 cm. long and wide, the inner ones 0.6 cm. long and wide, many-nerved, ciliate-margined; calyx tubular, about 1.5 mm. long, deeply bilobed, white-villous, the lobes quadrangular-ovate, 2-nerved, smooth on the inner surface; corolla reddish-purple, the throat yellow, the tube somewhat incurved, about 9 mm. long, scarcely 1 mm. wide at the middle, ampliate at the stamen insertion, very slightly attenuate at the throat, conspicuously coarctate below, pubescent throughout on the outer surface, the limb about 1 cm. wide, with the posterior lobe entire, the anterior one larger, about 6 mm. wide; stamens included, inserted about 3 mm. above the base of the corolla-tube; anthers broad; style about 4 times as long as the ovary, strict, filiform, 2.2 mm. long, smooth; stigma lateral, equal to the ovary in length; ovary about 0.6 mm. long, ovoid, obsoletely puberulent; ovules basal.

The type of this species was collected by Spencer la Marchant Moore (no. 189) in August on the summit of Serra da Chapada, Minas Gerais, Brazil. The collector says of it in his original description "Lippiae Gardnerianae, Schauer, proxima et ab ea distans statura humiliore, foliis villoso-tomentosis nec pubescenti-hirtis, bracteis minoribus pubescentibus aliisque signis."

The Archer & Gehrt s.n. [Herb. Inst. Bot. S. Paulo 36447], Herb. Rio de Jan. 31714, Löfgren 154, and Quiroga s.n. [Herb. Mus. Argent.

Cienc. Nat. 23852], distributed as this species, are actually L. lupulina Cham. Nothing is known to me of L. primulina in its typical form except what is stated in the bibliography.

LIPPIA PRIMULINA var. GOYAZENSIS S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 437. 1895.

Bibliography: S. Moore, Trans. Linn. Soc. Lond. Bot., ser. 2, 4: 437. 1895; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Castanea 10: 42. 1945; Moldenke, Alph. List Cit. 1: 223 (1946), 3: 693 (1949), and 4: 1078 & 1169. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Phytologia 3: 287. 1950; Moldenke, Résumé 94 & 462. 1959.

This variety differs from the typical form of the species in its smaller bractlets, 6.5 mm. long and wide and the thicker style which is only twice as long as the ovary.

The type of the variety was collected by George Gardner (no. 3406) near Duero, Goiás, Brazil, deposited "in Herb. Brit. Mus. et Kew", an isotype in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva was photographed by Macbride as his type photograph number 24661.

Moore (1895) says of this taxon: "Hujus speciei varietatem legit beat. Gardner prope Duero in provincia Goyazensi, a typo discrepantem imprimis ob bracteas minores (0.65 cm. long. et lat.) et stylum crassiusculum, ovarium modo duplo excedentem." The corolla is described as pinkish by Baldwin and as rose by Macedo. The plant has been collected in anthesis in July and September. Baldwin describes the plant as "not common" in the Matto Grosso. Herbarium material has been misidentified and distributed as Lantana sp.

In all, 3 herbarium specimens and 3 mounted photographs, including phototype material, have been examined by me.

Citations: BRAZIL: Goiás: G. Gardner 3406 [Macbride photos 24661] (It--photo of isotype, Kr--photo of isotype, N--photo of isotype); Macedo 3640 (S). Matto Grosso: J. T. Baldwin 3012 (W--1834303). Minas Gerais: Macedo 1239 (N).

LIPPIA PRINGLEI Briq., Bull. Herb. Boiss., sér. 1, 4: 340. 1896.

Synonymy: Lippia jurgensenii Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 239. 1900. Lippia jurgensenii Briq. ex K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902. Lippia callicarpifolia var. briquetiana Loes. in Fedde, Repert. Nov. Sp. 9: 366. 1911. Lippia briquetiana Loes. ex Moldenke, Suppl. List Invalid Names 5, in syn. 1941. Lippia allantanifolia M. E. Jones ex Moldenke, Alph. List Invalid Names Suppl. 1: 13, in syn. 1947. Lippia allantanflora M. E. Jones, in herb.

Bibliography: Briq., Bull. Herb. Boiss., sér. 1, 4: 340. 1896; Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 239. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Briq., Bull. Herb. Boiss., sér. 2, 4: 340.

1904; Loes. in Fedde, Repert. Sp. Nov. 9: 365--366. 1911; Loes., Verh. Bot. Ver. Brand. 53: 78 [Abhandl. 243]. 1912; A. B. Seymour, Host Ind. Fungi N. Am. 588. 1929; H. B. Davis, Life & Works Pringle 56, 668, & 669. 1936; Moldenke, Alph. List Common Names 8, 21, & 29. 1939; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 80, & 96. 1942; Moldenke, Alph. List Invalid Names 30 & 31. 1942; H. S. Gentry, Carnegie Inst. Wash. Publ. 527: 223 & 306. 1942; Moldenke, Phytologia 2: 67, 85, & 107. 1945; Moldenke, Alph. List Cit. 1: 13, 118, 162, 215, 218, 232, 233, & 241. 1946; Moldenke, Alph. List Invalid Names 13. 1947; Moldenke, Phytologia 2: 383 & 387. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 66 & 77. 1948; Moldenke, Alph. List Cit. 2: 400, 468, 477, 539--542, 595, 601, & 604 (1948), 3: 685, 689, 693, 729, 730, 769, 780, 786, 788, 829--831, 833, 873, 919, & 921 (1949), and 4: 1073, 1180, 1209, 1211, 1236, 1237, 1245, 1246, 1254, 1290, 1295, 1298, & 1303. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 162, & 190. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Spec. Subsp. Cont. Mold. Set 45 p. [2]. 1951; Moldenke, Inform. Mold. Set 46 Spec. 3 (1951), 49 Spec 2 (1954), and 51 Spec. 3. 1956; Moldenke, Résumé 37, 220, 310, 311, 313, & 462. 1959; Langman, Select. Guide Lit. Flow. Pl. Mex. 160 & 1010. 1964; Moldenke, Phytológia 12: 79, 109, 111, 112, 168, 190, 208, & 215. 1965.

Large symmetrical shrub or erect spreading symmetrical tree, to 15 m. tall, with heavy foliage; trunk to 30 cm. in diameter at breast height; bark light- or ashy-gray, rather smooth; leaves with a lemon-like odor; branchlets often fastigiate, densely appressed cinereous-pubescent; leaves decussate-opposite; petioles 1--2 cm. long, canescent; leaf-blades elongate, oblong-lanceolate, 8--20 cm. long, 3--9 cm. wide, very acute or acuminate at the apex, more convex toward the base and there rotund-cuneate, dark-green and pubescent above, pale-green or cinereous and densely tomentellous-pubescent beneath; venation penninerved, the lateral veins and veinlets parallel, perpendicularly joined, forming rectangular areoles in the parenchyma beneath and deeply sunken in the upper surface; the margins regularly serrulate with small closely set teeth 0.5--2 mm. high and 2--5 mm. apart, on the young leaves gibbous at the apex, the older ones more rounded; inflorescence regularly corymbosely paniculate, composed of beautifully pedunculate, numerous, axillary heads, whitish or greenish-white, the flower-clusters pale-green; peduncles 1.5--4 cm. long; heads small, 5--8 mm. wide during anthesis, many-flowered; outer bractlets ovate-triangular, 3.5 mm. long and 3 mm. wide, very slightly acuminate at the apex, beautifully venose, densely cinereous-pubescent, equaling the flowers; calyx small, membranous, obconic, 1 mm. long, densely long-pubescent on the outside, bilabiate, the lips subentire, 0.3--0.4 mm. long, rounded at the apex and with broadly obtuse sinuses; corolla exserted, hypocrateriform, varying from pale-orange, yellow, very pale-yellow, dull-golden, or yellowish-white to cream, dull-white, or white, said to open yellow and fade to cream-color, the tube 3 mm. long, cylindric at the base and there 0.6 mm. wide, gradually ampliate toward the a-

pex and there 1.3 mm. wide, the throat inflated (especially below), the upper and lateral lobes subequal, 0.4--0.5 mm. long, about 0.9 mm. wide, the lowest lobe oblong-elongate, 1.5 mm. long and 0.9 mm. wide, eventually recurved-deflexed, rounded at the apex, more venose; nectaries none; stamens included; filaments and anthers glabrous, inserted at the middle of the corolla-tube; fruit small, dry, the pericarp hard, composed of 2 pyrenes, separable.

The type of this handsome species was collected by Cyrus Guernsey Pringle (no. 1733) in hollows of a barranca near Guadalajara, Jalisco, Mexico, in 1888, and is probably deposited in the Herbier Boissier at Geneva. The type of L. jurgensenii was collected by C. Jurgensen (no. 431) at Rio de Taba, east-northeast of Oaxaca, in Oaxaca, Mexico, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where it was photographed by Macbride as his type photograph number 24655. Both species were named in honor of the collectors of the type specimen.

Cotypes of L. callicarpifolia var. briquetiana and of L. briquetiana were collected by Caecilia and Georg Eduard Seler (no. 4358) in hedges along roadsides at Ejutla, Oaxaca, Mexico, and by Rudolph Endlich (no. 1067) on volcanic soil with remnants of woods on Rancho Mirador, at an altitude of 1450 meters, at Chapultepec, near Cuernavaca, Morelos, Mexico, and were deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed. The cheironymous names, L. allantanifolia and L. allantanflora, were apparently based on a collection made by Marcus Eugene Jones (no. 23423) at Tepic, Nayarit, Mexico, on February 14, 1927, typewritten on the labels, but never validly published by him.

Briquet (1898) says of his L. pringlei: "Ab inventore refertur Lippia haec pulcherrima cum dubio ad L. callicarpaefolium Kunth. Haec species differt autem tubo coelo capitulis quinquies ad decies majoribus globosis, bracteis magnis crebris membranaceis suffultis. L. pringlei nobis magis cum L. umbellata Cav. affinis videtur, quae capitulis ejusdem forma sed ter majoribus et foliorum forma et nervatione differt."

Loesener (1911) says concerning his L. callicarpifolia var. briquetiana: "Bracteis latioribus brevius vel vix acuminatis capitulis paullo maioribus fructiferis usque 12 mm diam. a typo recedens." Also, "Es erscheint mir nicht ausgeschlossen, dass nach genauerer monographischer Durchsicht eines reicheren Materiales und scharfer Festsetzung der Artengrenzung von L. callicarpifolia H.B.K. hier aufgestellte Varietät als besondere Art zu betrachten sein werde. Mit L. bicolor Kunth et Bouché hat auch sie trotz der grosseren Blutenkopfe jedenfalls keine spezifische Gemeinschaft."

The species has been found in fields, ravines, and barrancas, open places and thickets, narrow valleys and the valleys of small streams, woods, oak-pine forests, short-tree forests, deciduous woodlands, and pine forests on mountains, in rather wet spots in oak woods, in arroyos and open places on hillsides, dry rocky

places and brush along trails. It inhabits hills and hillsides, oak ridges and the slopes of barrancas, brushy slopes and precipitous rocky south-facing slopes, flat land near rivers, and shady canyon bottoms. It has been collected in meadow margins, at the edge of cornfields, and near water, at altitudes of 165 to 2000 meters, flowering and fruiting from September to April. McVaugh found it "abundant in oak-pine forest" in Jalisco; he and Koelz describe it as "abundant on hills among other trees" and "occasional here, more abundant and weedy in the valley below". Gentry (1942) describes it from "arroyo and canyon margins, Short-tree Forest and Oak Forest, 1500--3500 feet" in Sonora. He says "At Carimechi by the Rio Mayo a single, isolated, treelike shrub; at Curohui a spreading symmetrical tree 8--10 m. high, with light-gray bark. Flowers early spring. This is a tree of the canyons. The Warihios regard its medicinal qualities as particularly efficaceous; the sap is used for toothache; the leaves after being steeped in hot water are coated with mentholatum, other ointment, or grease and applied to bruises, sores, headaches, etc." He also describes it as from arroyos in the Lower Sonoran Zone in Sonora.

The flowers are described as "yellow" on Hinton 11717; "yellowish-white" on J. Gonzalez Ortega 5707; "very pale-yellow" on McVaugh 15335; "yellow or cream" on R. S. Ferris 5907; "pale-orange" on Hinton 13482; "dull-golden" on McVaugh & Koelz 673; "dull-white" on McVaugh & Koelz 840; "white" on Galeotti 768, Hernandez Xolocotzi 125, and Hinton 11278; and "open yellow, fade cream" on E. J. Alexander 358.

Vernacular names recorded for the species are "bacaton", "bacatón", "batayaqui", "batayáqui", "choila", "chokili", "matayaki", "matayali", "mucuay", "nacare", "nacari", "nacavé", "palo blanco", "tabaquilla", "tabaquillo", "talabáo", "talakao", "tecote", and "vara blanca".

It is attacked by the following fungi: Nephlyctis conjuncta (Dietr. & Holw.) Arth. [Puccinia conjuncta Dietr. & Holw.], Prospodium lippiae (Speg.) Arth. [Puccinia lippiae Speg.], Uredo lippiae Dietr. & Holw. (1901), and U. lippiae Speg. (1898). The J. Gonzalez Ortega 463 and 1132 from "San Ignacio, Ajoya" and "San Juan" may be from either Sinaloa or Nayarit. Edw. Palmer 479 was previously identified both as L. callicarpaefolia H.B.K. and L. umbellata Cav. Standley says of Purpus 8206, identified originally as L. callicarpaefolia, "I should call it a form of L. umbellata Cav." Endlish reports that the wood of this plant is used as firewood.

Material of L. pringlei has been misidentified and distributed in herbaria under the names L. callicaepaefolia H.B.K., L. callicarpaefolia H.B.K., L. callicarpifolia H.B.K., L. floribunda H.B.K., L. gentryi Standl., L. graveolens H.B.K., L. hirsuta Mutis, L. mycrocephala Schlecht., L. tepicana Moldenke, L. umbellata Cav., Buddleia sp., and Brickellia sp. On the other hand, the Wiggins

13187, distributed as L. pringlei, is actually L. gentryi Standl.

In all, 249 herbarium specimens and 6 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: MEXICO: Aguascalientes: J. Gonzalez Ortega 216 (Me, Me). Durango: Edw. Palmer 479, in part (Me). Guerrero: D. S. Correll 14396 (Rf); Hinton 11278 (Mi, N, W--2020401), 11717 (G, La, N, N); Edw. Palmer 479, in part [Acapulco, Oct. 1894--March 1895] (A, C, Ca--104932, G, Mi). Jalisco: Diquet s.n. [Decembre 1899] (N); Galeotti 787 (Br); R. McVaugh 11788 (Mi), 14335 (Mi); Mexia 1354 (A, Ca--350251, Du--195381, Gg--157210, Gg--282789, La, Mi, N); Pringle 1733 (A--isotype, A--isotype, Br--isotype, C--isotype, Ca--104937--isotype, F--photo of isotype, G--isotype, N--photo of isotype, Pa--isotype, S--isotype, Si--photo of isotype, Vt--isotype, Z--photo of isotype), 2743 (Ca--104931, Me, Me, Ob--50724), 11088 (G, I, Mi, S, Vt), 11669 (G, Gg--421283, It, Mi, Rf), s.n. [4.XII.1902] (S); Purpus 508 (Po--64302). México: Hinton 315 (N), 2330 (A, N), 2574 (N), 2921 (A, N, N), 7237 (N), 13482 (La); Matuda 27854 (Cb), 29867 (Ss), 30505 (Ss). Michoacán: Arsène 5293 (A, Cm, G, N, S, Ur); J. H. Hill 32 (Mi); Hinton 12949 (Au--121219, N, Oa--6697, Rf), 13482 (Au, G, It, Mi, N, Rf), 13614 (Au, N, Oa--8820, Rf); E. W. Nelson 6838 (G, N); Purpus 508 (Ca--139663). Morelos: Bourgeau 1217 (Br, G, S); Fröderström & Hultén 85 (G, N, S); Lyonnet & Elcoro 1166 (W--1745976); J. Mann 8 (N, W, Z); Moldenke & Moldenke 19830 (B, Es, F, Fy, Hw, Lg, Lm, Mg, Mr, N, No, Ot, Rs, S, Sm, Ss); Pringle 11087 (Cm, G, Gg--421285, It, Me, Me, Mi, N, Vt), 13982 (Au--181668, Ca--168242, G, Gg--421284, Mi, Mi, S, St, Vt); Seler & Seler 4337 (G, Gg--245896). Nayarit: R. S. Ferris 5796 (Du-185340), 5907 (A, Du--185339); J. González Ortega 463 (Me, Me), 1132 (Me); M. E. Jones 23423 (Ca--400555, N, Po--191957); McVaugh & Koelz 673 (Mi), 840 (Mi); Edw. Palmer s.n. [Tepic, Jan.--Feb. 1892] (S). Oaxaca: E. J. Alexander 358 (N, N, N, N, N, N, N, W); Chico s.n. [Chonta] (N); C. Conzatti 2343 (G), 3866 (Me); Conzatti & Conzatti 4857 (Mi); Conzatti & Gonzalez 526 (G, Me); Galeotti 768 (Br), 7953 (Br, Br, G, N); Holway 3719 (G); Jurgensen 431 [Macbride photos 24655] (Kr--photo, N--photo, N--photo); E. W. Nelson 1840 (G); Seler & Seler 1460 [Macbride photos 17497] (Du--283956, G, G--photo, Gg--245940, Kr--photo, N--photo), 1743 (Du--283957, G, Gg--242725, Gg--245938), 4358 (G, Gg--245939); C. L. Smith 218 (Ca--975393, N). Sinaloa: J. González Ortega 351 (Me), 937 (Me), 1135 (A, Ca--406441, Du--173152, Du--192867, G, G, Io--140357, Me, Me, Po--192872, W--1532917), 6548 (Du--173142, G), 7125 (Gg--231570); Mexia 458 1/2 (Ca--367620, Gg--142080); Edw. Palmer 1199 (Ca--104947, G, Mi, N, N, S); Rose, Standley, & Russell 14798 (N); C. L.

Smith 271 (G). Sonora: H. S. Gentry 1179 (A, Ca—646236, Fs, Ge, I, Me, Me, Mi, N, N), 2037 (A, Fs, Ge, I), 3669 (A, Ca—602695, Fs, Ge), 4814 (Ca—652119, Du—274254, G, Ge, Me, Mi, N). Vera Cruz: Purpus 8206 (A, Ca—200697, G, N, S). State undetermined: Chico s.n. (N); Collector undesignated 1063 (Me), s.n. (F—842569); C. Conzatti s.n. (Me). CULTIVATED: Germany: Karwinski s.n. (Br, Br).

LIPPIA PRINGLEI f. INTECTA Moldenke, Phytologia 9: 99. 1963.

Bibliography: Moldenke, Phytologia 9: 99. 1963; Moldenke, Résumé Suppl. 6: 4. 1963; Moldenke, Biol. Abstr. 43: 643. 1963; Hocking, Excerpt. Bot. A.7: 454. 1964.

This form differs from the typical form of the species in having the lower leaf-surface merely very short-puberulent with rather distant hairs.

The type of the form was collected by Efraim Hernández Xolocotzi (no. 125) at El Llano, south of San Blas, Nayarit, Mexico, on January 7, 1944, and is deposited in the herbarium of the Texas Research Foundation at Renner, Texas. The plant is said to be a tree 3—6 meters tall, with white flowers, and is called by the natives "tacote". It is known thus far only from the type collection, of which 3 herbarium specimens have been examined by me.

Citations: MEXICO: Nayarit: Hernández Xolocotzi 125 (Mi—isotype, Rf—type, Z—isotype).

LIPPIA PSEUDO-THEA (A. St.-Hil.) Schau. in A. DC., Prodr. 11: 582. 1847.

Synonymy: Lantana pseudo-thea A. St.-Hil., Plant. Usuel. Bras. pl. 70, pp. 1—3. 1824—1828. Lantana pseudothea A. St.-Hil. apud Spry, Useful & Ornament. Pl. India 31. 1841. Lippia pseudo-thea Schau. apud Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894. Lippia pseudothea Schau. ex Moldenke, Résumé Suppl. 10: 6, in syn. 1964. Lippia pseudo-thea Leut. ex Moldenke, Résumé Suppl. 10: 6, in syn. 1964.

Bibliography: A. St.-Hil., Plant. Usuel. Bras. pl. 70, pp. 1—3. 1824—1828; Spry, Useful & Ornament. Pl. India 31. 1841; Presl, Wseobecny Rostlinopsis 2: 1203. 1846; Schau. in A. DC., Prodr. 11: 582. 1847; Lindl., Med. & Oeconom. Bot. 223. 1849; Schau. in Mart., Fl. Bras. 9: 233. 1851; Bocq., Adansonia 3: 244. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541. 1911; Gerth van Wijk, Dict. Plantnames 2: 466 & 1491. 1916; Moldenke, Alph. List Common Names 12 & 30. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Stellfeld, Os Binom. Drog. Veg. Micro-biog. Aut. 134. 1943; Darlington & Janaki Ammal, Chromosome Atl. 271. 1945; Moldenke, Phytologia 2: 69, 70, 72, 85, & 107. 1945; Moldenke, Alph. List Cit. 1: 238. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 12 & 15. 1947; Hager in Reickert, Trat. Farmac. Práct. 5: 790. 1948; Moldenke,

Alph. List Cit. 2: 486 (1948) and 3: 726 & 731. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Hocking, Dict. Terms Pharmacog. 283. 1955; Mendes Magalhães, Anais V Reun. Anual Soc. Bot. Bras. 282--283. 1956; Moldenke, Résumé 94, 306, 316, & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 10: 6. 1964; Moldenke, Phytologia 12: 24, 87, 141, & 280. 1965.

Illustrations: A. St.-Hil., Plant. Usuel. Bras. pl. 70. 1824--1828.

Shrub, 0.5—1.5 m. tall, erect, with the odor of turpentine, the younger parts viscid with glanduliferous hairs; stems simple or few-branched above, floriferous at the apex; branches subterete; leaves decussate-opposite or ternate, approximate, sessile; leaf-blades rather rigid, lanceolate or oblong, 2.5—5 cm. long, resembling those of Salix repens L., acute at the apex, rounded or subcuneate and entire at the base, serrulate along the margins from the middle upwards, penninerved, venose, rugose above with impressed venation, shiny and roughened above and appressed-strigose with papulose hairs, shortly canescent-tomentose or strigose-hirsutulous beneath with the prominent reticulation sparsely strigose or hirsute, the young leaves viscid, the adult ones eglandular and scabrous with the persistent bases of the hairs; inflorescence axillary; peduncles solitary, equaling or surpassing the subtending leaves, glandular-viscid; heads hemispheric, glandular-viscid; bractlets lanceolate, acute at the apex, equaling the corolla-tube, strigose-hirtous and glandular-pubescent on the back; calyx very short, bifid, lightly pubescent, finally splitting into 2 small scales; corolla hypocrateriform, deep-pink or rose to violet, its tube about 4 mm. long, rather straight, slender below, gradually ampliate and pubescent upwards, the limb oblique, 4-parted, the lobes retuse at the apex, the lowest one enlarged.

This very distinct species was based on a specimen collected by August François Cesar Prouvençal de Saint-Hilaire among quartz rocks on the Serra do Cadonga near the town of Tapanhoacanga, Minas Gerais, Brazil. Schauer (1851) cites also another collection by him from the Admantu district in the same state, and a Sellow collection ("loco non allato"), and says of the species "Affinis L. pumilae et nanae ab utraque tamen bene distincta."

Saint-Hilaire (1824--1828) says "Cette espèce est commune sur la Serra de Cadonga, auprès du bourg de Tapanhoacanga dans la province de Minas Geraes, où el végète au milieu des rochers quartzeux; on la trouve aussi dans le district des diamans. Elle fleurit au mois de mars."

The Sellow s.n. [Brasilia] specimen in the University of Vermont herbarium, identified as L. pseudo-thea, proves to be L. arechavaletae Moldenke. The Campos Novaes 930, also distributed as L. pseudo-thea, is actually L. salviaefolia Cham., while Regnell s.n. [Herb. Mus. Nac. Rio Jan. 14857] is L. corymbosa Cham.

Schauer (1847) classifies this species in his Section Zapania,

Subsection Axilliflorae. It has been collected on sandy campos, at 1260 meters altitude, flowering from March to June. Mexia calls it "frequent, scattered, in disintegrated rock between crags". The corolla is described as "deep-pink" on Mexia 5749, "rose" on Brade 13908, and "violet" on Mendes Magalhães 1802. Vernacular names reported for it are "camara", "camara faux thé", "capitao do mato", "capitão do matto", "capitão do matto", "cha de pedreste", "chá de pedreste", "faux thé", and "thé de piéton".

Lindley (1849) notes that this plant is aromatic and fragrant, used in the treatment of coughs, rheumatism, and medicated baths. When dried it forms an agreeable tea. Hocking (1955) reports that the leaves have a volatile oil used as an antipyretic, diaphoretic, and tea substitute, and that the fruit is edible. Hager (1948) says "Extracto flúído do lippia. Extractum Lippiae fluidum. Brasil: 1000 gr. de la droga en polvo III para 1000 cc. de extracto flúído, por el método B (v. éste) con mezcla de 100 cc. de glicerina, 250 cc. de alcohol (92% en peso) y 650 cc. de agua como menstruo I, y mezcla de 1 vol. de alcohol y 3 vol. de agua como menstruo II. — Jarabe de lippia. Siripus Lippiae. Brasil: 50 cc. de extracto flúído; c. s. de jarabe simpla para 1000 cc."

In all, 10 herbarium specimens have been examined by me.

Citations: BRAZIL: Minas Gerais: Brade 13908 [Herb. Rio de Jan. 29536] (B); Glaziou 19709 (Br, N); Mello Barreto 9649 (Ja—32308); Mendes Magalhães 1802 (Be—14563); Mexia 5749 (Gg—286574, Go, N, S, W—1618223).

LIPPIA PUMILA Cham., Linnaea 7: 218. 1832.

Bibliography: Cham., Linnaea 7: 218. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 597. 1843; Walp., Repert. Bot. Syst. 4: 45. 1845; Schau. in A. DC., Prodr. 11: 582. 1847; Schau. in Mart., Fl. Bras. 9: 234. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541. 1911.

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## BOOK REVIEW

Alma L. Moldenke

"Ecology of Soil-borne Plant Pathogens - Prelude to Biological Control", edited by Kenneth F. Baker & William C. Snyder, 571 pp., illustr. University of California Press, Barkeley 4, California. 1965. $12.00

The included 41 interdisciplinary papers were presented at the first International Symposium on Factors Determining the Behavior of Plant Pathogens in Soil, which was held at the University of California in the spring of 1963. Also included are the

pertinent questions and answers from the floor, valuable bibliographies for each paper, summaries and syntheses on topical groups of papers, as well as suggestions for patterns for future research and additional conferences. This conference and this volume were wisely supported by the now well recognized alphabetical groups, NRC, NSF, NIH, and USDA. This book provides a valuable permanent record of the scientific ideas and experimental data presented to and by these leaders invited from twenty-four countries, not only for them but also for the many other interested persons who did not attend the conference -- providing this latter group even the "flavor" of the sessions through the inclusion of the often spirited discussions. The entire work is well indexed.

The included material is organized under the following topic sections, each chaired by a leader in that particular field:

I. Introduction
II. The soil organisms
III. The soil environment
IV. The plant root and the rhizosphere
V. Pathogenesis and resistance
VI. Mechanisms of antagonism
VII. The soil inoculum
VIII. Interactions between soil, microorganisms, and plant

In his introductory remarks Dr. Garrett of Cambridge claims his belief that "the eventual prospects for biological control are brighter than ever before, partly because we can at last comprehend the magnitude of the problems to be solved". In the summary of Dr. Wilhelm's final paper, the author states that "The life of a soil-borne organism in nature is an expression of the reaction of the organism to the environment within its broad genetic framework. The rich genetic endowment of microorganisms allows for range over diverse environments, different factors in the environment, such as temperature, kind of substrate, associated organisms, proximity to plant roots, calling forth different responses on the part of the microorganisms. There are no precise niches to which microorganisms are precisely adapted, and no one environment supplies the ideal conditions for all of the physiological processes of organisms. Organisms even extremely fastidious in nutritional requirements are numerous in the soil and rhizosphere. Their existence depends upon complex compounds essential for growth supplied by associated organisms. During countless generations, selection for robust autotrophic organisms has not eliminated these 'unfit' and 'deficient' ones. This fact insures the biological complexity of the soil, which is the primary bulwark against inroads by root-destroying pathogens which threaten our agriculture."

# ISOETES IN SOUTHEASTERN UNITED STATES

by

Clyde F. Reed*

The genus Isoëtes as represented in Southeastern United States may be divided into two general groups: first, those species having megaspores with irregularly crested or reticulate surfaces and growing nearly entirely as aquatics (rarely being amphibious) — as I. engelmannii A.Br. and its two varieties, var. caroliniana A.A.Eaton and var. georgiana Engelm.; and second, those species having megaspores with tuberculate, pebbled or papillate surfaces and growing in wet prairies, wet sandy or rocky glades, granite pot-holes and in mud along tidal as well as non-tidal waterways (mainly coastal) — as I. riparia Engelm. ex A.Br. and its varieties, var. reticulata (A.A.Eaton) Proctor and var. palmeri (A.A.Eaton) Proctor (incl. forma saccharata (Engelm.) Proctor); I. virginica Pfeiffer and its var. piedmontana Pfeiffer; I. flaccida Shuttlew.; I. melanospora Engelm.; I. melanopoda Gay et Dur. and I. butleri Engelm.

Ecologically, Isoëtes engelmannii, the most widely distributed of the species studied, is aquatic, in fresh-water rivers, lakes and ponds on the Coastal Plain, in the Piedmont and in the Mountains; Isoëtes riparia, in the typical form, lives in fresh-water reservoirs and lakes in the Piedmont, bearly reaching the upper limits of tidal areas, whereas var. reticulata and var. palmeri f. saccharata prefer the tidal rivers of the Delaware and Chesapeake Bays; Isoëtes virginica lives in fresh-water lakes and rivers on the Outer Piedmont in Virginia, North Carolina, South Carolina and Georgia, whereas var. piedmontana is confined to the acid granitic areas of North Carolina, South Carolina and Georgia; Isoëtes melanospora also prefers the acid granitic pot-holes in South Carolina and Georgia; Isoëtes flaccida lives in springs and in mucky areas along rivers, and barely reaches brackish areas on the Coastal Plain in Georgia and Florida; Isoëtes melanopoda and Isoëtes butleri are more interior species, only reaching eastward into the Mississippi River bottomlands from Iowa and Illinois, southward to Alabama and Louisiana, with I. butleri coming as far east as central Tennessee and western Alabama in the cedar glades.

Isoëtes melanopoda and Isoëtes butleri form a complex, even though the first is polygamous and the second, dioecious. Specimens

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collected on the same day, in the same place, with the same collection number, have been authoritatively named both ways. Even though extremes can be keyed out, many intermediate specimens confuse a description for either species. Most but not all specimens which can be named butleri live on limestone or in cedar barrens, whereas most but not all specimens which can be named melanopoda live on granite, quartzite, loess plains and the like. To the east Isoëtes melanospora and I. virginica var. piedmontana prefer granite habitats, thus linking them to the melanopoda-complex.

Isoëtes virginica var. virginica lives in muddy ponds, along creeks and rivers, in swamps in the Piedmont and Inner Coastal Plain areas. The southern form of this complex is I. flaccida in Florida and Georgia, giving rise to Isoëtes virginica (typical) northward in Georgia, South Carolina, North Carolina and Virginia, up to the Blue Ridge Mountains; then coastal-wise being replaced by Isoëtes riparia and its varieties from northeastern North Carolina and southeastern Virginia, up the Chesapeake Bay (palmeri) and the Potomac River (reticulata) to Piedmont Pennsylvania and then northward to Canada; and finally to confuse the issue thoroughly Isoëtes engelmannii in its three forms, var. engelmannii, var. caroliniana and var. georgiana overlays the entire distribution of all these species.

Morphologically, there are several likenesses and differences which indicate these species form a complex.

First, the complete velum appears in I. melanospora which belongs more to the melanopoda-piedmontana-butleri-complex, yet in these species the velum is lacking or variously limited in size; and in I. flaccida which is a species more on the Coastal Plain, in flowing rivers, streams and the like, not too different from I. engelmannii var. georgiana and I. riparia var. riparia from further north.

Second, the megaspores in I. engelmannii have a definite irregularly crested reticulation over the surface. In var. caroliniana and var. georgiana this reticulation become less distinct, more jagged or spiny with deeply cut margins. By the time one gets to southern Georgia and Florida, I.flaccida shows numerous flattish tubercules which may be distinct or may become confluent into labyrinthiform wrinkles. In I. melanospora the warts may be distinct or confluent; in I. melanopoda the tubercules are low, and more or less confluent, often united into wrinkles, or may be almost smooth; in I. butleri the tubercules may be distinct or confluent; and in I. virginica the ridges are irregularly marked with points and discontinuous ridges, not too different from some specimens of

I. engelmannii var. caroliniana and I. riparia var. riparia (which also has conspicuous jagged crests with sharp distinct or slightly confluent peaks). Also the quadrangular cross-section of the leaves in I. engelmannii and I. virginica link them closer together.

Third, in size I. engelmannii has leaves up to 6 dm. long, yet I have seen specimens from mountainous Virginia with very small leaves (2-4 cm. long), with mature megaspores which are reticulate on all surfaces. In I.engelmannii var. caroliniana the leaves are shorter and stouter than in the typical variety, and tend to spread or sprawl. In I. engelmannii var. georgiana the leaves are fewer, more slender, 25-30 cm. long and the megaspores are larger (480-560 mu) than in the other varieties (400-530 mu). In I. riparia var. riparia the leaves vary from 9-30 cm. in length, are usually straight and are rather rigid. The megaspores have rather jagged crests forming irregular discontinuous ridges and occasional partial reticulations. Many specimens from Piedmont Maryland and Pennsylvania have been mis-identified as I. engelmannii, perhaps because of the reticulations, but the more rigid leaves are a more dependable character to rely upon in this species. I.flaccida has leaves 40-60 cm. long, although in some forms of I. flaccida the leaves are more slender and tend to be erect. The other species have relatively short leaves: in I. riparia var. palmeri (especially in forma saccharata) they vary from 6-15 cm. long and frequently are curved; in I. melanospora they are rarely over 6 cm. long; in I. virginica var. piedmontana the leaves are chiefly 7-12 (20) cm. in length, whereas in I. virginica var. virginica they may be up to 30 cm. long. In I. melanopoda the leaves are up to 45 cm. long, but in I. butleri they are rarely over 22 cm. long.

Other variables are: spotted, striped or unspotted walls of the sporangia; shape and size of the sporangia; polygamous or dioecious; peripheral strands in the leaves, varying from 4 to 6 to none; shape of the ligule; microspores spinulose, papillose or smooth; number of leaves per mature plant.

From the characteristics studied I think that there are three main species-complexes involved in Isoëtes in Southeastern United States. Isoëtes melanopoda is a mid-west genotype which extends eastward and is expressed by Isoëtes butleri, Isoëtes piedmontana and Isoëtes melanospora. Isoëtes engelmannii is a second genotype, more northern in origin, which is expressed by three varieties and Isoëtes virginica and Isoëtes flaccida. And a third genotype is Isoëtes riparia, of more northeasterly origin, expressed by its various varieties. Isoëtes virginica links I. engelmannii and I. riparia var. riparia, the extremes being I. riparia var. reticulata

and I. riparia var. palmeri (incl. f. saccharata) on the one hand and I. engelmannii var. caroliniana and var. georgiana on the other. Isoëtes flaccida with its various forms links I. virginica and I. riparia with I. engelmannii var. georgiana. However, I.flaccida with its complete velum, stands to the engelmannii-virginica-riparia-complex as I. melanospora stands to the melanopoda-piedmontana-complex.

The key below gives a rather complete description for each species or variety found in Southeastern United States. Several hundred sheets of Isoëtes from this area have been annotated by me in the last ten years. Where there are unusual observations about a specimen, they will be mentioned in the annotated list given below. Undoubtedly, Isoëtes is a difficult group, and I hestitate to lump the species and varieties simply because they are difficult to separate. Although many specimens have been collected, no attempt has been made to collect any one species in various phases of its growth from the same colony. I feel the key below tends to separate our Southeastern species of Isoëtes in a fairly orderly manner.

## Key to the genus Isoëtes in Southeastern United States

1. Plants mostly aquatic (amphibious), submerged in water or along the margins of lakes, ponds, rivers and in ditches; megaspores with irregularly crested or reticulate surfaces.
   2. Leaves up to 100, or more, 1-6 dm. long, loosely spiralling and ascending to arching; 1-3 mm. wide at the middle, light green, quadrangular in cross-section, long-attenuate; peripheral strands usually 4; ligule triangular, 1 mm. long; sporangia oblong, 6-12 mm. long, pale, the wall mostly unspotted; velum very narrow, less than one-fourth covering the sporangium; megaspores 400-520 mu in diameter, with thin-walled honeycomb-reticulations, the ridges low and rounded; microspores 21-30 mu, smooth or nearly so. Amphibious in fresh-water situations, New Hampshire to Georgia, west to Indiana, Illinois and Missouri.....
   .....1A. I. engelmannii var. engelmannii.
2. Leaves fewer, up to 30 cm. long, more slender.
   3. Leaves 15-30, up to 22 cm. long, loosely spreading or sprawling; sporangia 6-8 mm. long, one-third to two-thirds covered by velum; megaspores 400-530 mu in diameter, the high honeycomb-ridges appearing jagged or spiny through the crisped and deeply cut margins; microspores 26-30 mu, densely muricate. Bottomlands, shallow exsiccated pools, pineland streams in southeastern

Virginia and eastern coastal North Carolina, and in pools, lakes, bogs in upland North Carolina, South Carolina and Georgia.....1B. I. engelmannii var. caroliniana Eaton.

3. Leaves about 15, 25-30 cm. long, rather slender; sporangia oval, with narrow velum; megaspores 480-560 mu (rarely 600 mu) in diameter; microspores 28-31 mu long, smooth. Mostly submerged, swamps, creek-banks in mucky soil or black mud, Eastern Coastal Plain to edge of Piedmont in North Carolina, South Carolina and Georgia.....1C. I. engelmannii var. georgiana Engelm.

1. Plants usually growing in wet prairies, in wet sandy limestone or rocky glades, or in wet granite pot-holes, sometimes in mud along rivers; megaspores with tuberculate, pebbled or papillate surfaces, occasionally with the tubercules confluent.

4. Velum complete; sporangia oval to orbicular.

5. Peripheral strands 4; leaves 10-35, light green, 4-6 dm. long, submersed or emersed; sporangia oval, 4-6 mm. long; megaspores 300-420 mu in diameter, covered with numerous to few large flattish tubercules, these distinct or confluent into labyrinthiform wrinkles, light colored; microspores light brown, 26-33 mu long, slightly papillose. In lakes, ponds and along rivers, Florida and Georgia.....2. I. flaccida Shuttlew.

5. Peripheral strands none; leaves 5-10, distichous, slender, light green, 5-6 cm. long; sporangia orbicular to nearly obcordate, 1-2 mm. long; megaspores 350-450 mu in diameter, with distinct or confluent warts, dark colored; microspores 28-31 mu long, smoothish or slightly papillose. In shallow excavations or pot-holes in granite, Georgia and South Carolina....3. I. melanospora Engelm.

4. Velum incomplete or lacking; sporangia oblong.

6. Peripheral strands 4 (or 6), sometimes strongly developed, rarely absent; leaves 0.8-4.5 dm. long, 0.4-1.3 mm. wide at the middle; megaspores tuberculate, the tubercules often confluent to form discontinuous ridges or crests, rarely almost smooth; microspores spinulose or papillose.

7. Leaves 8-30, 0.8-2.2 dm. long, pale or brown at the base; ligule narrow triangular to elongate.

8. Leaves 8-30, 0.8-2.2 dm. long, these triangular in cross-section, mostly 0.4-0.9 mm. wide at the middle; velum wanting or very narrow; ligule narrow-triangular, about 1 mm. long; sporangia 6-7 mm. long, usually brown-lineolate; megaspores 480-650 mu in diameter, with distinct or confluent tubercules; microspores 27-37 mu long, papillose; plants dioecious. Terrestrial, growing in cedar barrens, limestone and alkali flats. Tennessee to Missouri, Arkansas, Kansas and Oklahoma.....4. I. butleri Engelm.

8. Leaves 8–15, 1.5–3.0 dm. long, bright green, brown and shining at the base with narrow whitish margins, nearly quadrate in cross-section, mostly 0.4–0.6 mm. wide at the middle; velum covering one-fifth to one-third of sporangium; ligule elongate; sporangia broadly oblong, 3–4 mm. long; megaspores 440–470 mu in diameter, irregularly marked with points and short discontinuous ridges; microspores 30–33 mu long, covered with spinules. Amphibious in meadows, in Piedmont and Coastal Plain, Virginia to Georgia.....
.....6. I. virginica Pfeiffer.

7. Leaves 15–60, 0.7–4.5 dm. long, dark chestnut-brown to blackish at base, rarely paler; ligule deltoid to narrow.

9. Leaves 1.2–4.5 dm. long, dark chestnut-brown at base, rarely paler (f. pallida (Engelm.) Fern.), mostly 1–1.3 mm. wide at the middle; velum narrow to broad; ligule deltoid, 1 mm. long; sporangia brown-spotted, 0.5–3 cm. long; megaspores 280–440 mu in diameter, with low more or less confluent tubercles, often united into wrinkles, or almost smooth; microspores 23–28 mu, spinulose; plants polygamous. Amphibious, moist prairies, in overflowed fields, Iowa to Illinois, Missouri and Texas, Minnesota, South Dakota, (southern New Jersey).....
.....5. I. melanopoda Gay & Dur.

9. Leaves 0.7–1.5 (rarely 2.0) dm. long, slender, brown at the base; peripheral strands 4 or 6, or entirely lacking; sporangia brown with a narrow velum; megaspores 400–480 mu in diameter, marked irregularly with low rough processes and short discontinuous ridges, sometimes branching; microspores 27–33 mu long, spinulose. In shallow granite outcrops on Piedmont, but some stations almost within the boundaries of the Coastal Plain, North Carolina, South Carolina and Georgia.....
.....7. I. piedmontana (Pfeiffer) Reed.

6. Peripheral strands absent; leaves 10–30, rather slender, 0.9–3 dm. long, 0.9–1.5 mm. wide at the middle, sharp-pointed, pale green; ligule minute, elongate; sporangia oblong, 3–8 mm. long, the wall brown-spotted or completely brown, covered one-fourth to one-third by the velum; megaspores 440–660 mu in diameter, with conspicuous jagged crests with sharp distinct or slightly confluent peaks, sometimes giving a granular appearance; microspores 25–33 mu long, tuberculate, papillate or smooth.....8. I. riparia Engelm.

10. Megaspores with high, sharp, mostly irregular crests; leaves usually straight and rather rigid, 10-30, 9-30 cm. long; megaspores 440-660 mu in diameter, the crests on all faces irregular, crowded, tending to be confluent; microspores 25-33 mu long, tuberculate. Gravelly and muddy tidal and non-tidal, freshwater shores, reservoirs, Maine to New Jersey, Pennsylvania, Maryland and Delaware to South Carolina.... .....8A. I. riparia var. riparia.

10. Megaspores with low crests, tubercules or ridges.

11. Outer face of megaspore low-reticulate; leaves straight, erect, rather rigid, few, 7-17 cm. long; megaspores 400-500 mu in diameter, the commissural faces low-granular, the outer face with inconspicuous low reticulations; microspores smooth. Tidal mud flats of Potomac River and its tributaries, near Washington, D.C..... .....8B. I. riparia var. reticulata (Eaton) Proctor.

11. Outer face of megaspore with tubercules giving it a distinctly granular appearance; leaves 8-30, 6-18 cm. long, often recurved, though sometimes straight; megaspores 400-520 mu in diameter, the crests low and crowded; microspores 22-32 mu long, smooth or sparingly low-papillate or finely granular. Gravelly or muddy fresh to slightly brackish tidal shores, Chesapeake Bay, Delaware to District of Columbia and southeastern Virginia..... .....8C. I. riparia var. palmeri (Eaton) Proctor.

1. ISOETES ENGELMANNII A.Br., Flora, 29: 178. 1846; Silliman's Jour. Sci. II, 3: 53. 1847; Baker, Jour. Bot., 18: 105. 1880; Motel. & Vendr., Linn. Soc. Bord., 36: 374, t. 12, f. 1-9. 1883; Pfeiffer, Ann. Mo. Bot. Gard., 9: 201-207. 1922; Reed, Bol. Soc. Brot., 2a ser., 27: 25. 1953.

Syn.: Calamaria engelmannii (A.Br.) Kuntze, Rev. Gen. Pl., 2: 828. 1891-93; Isoëtes engelmannii var. gracilis Engelm. in Gray's Manual, ed. 5: 677. 1876; Isoëtes engelmannii var. fontana Eaton, Fern Bull., 13: 52. 1905; in Gray's Manual, ed. 7, p. 61. 1908; Isoëtes engelmannii forma fontana (Eaton) Clute, Fern Allies, 258. 1905.

1A. ISOETES ENGELMANNII A.Br., var. ENGELMANNII. Map 1A(dots).

Missouri: St. Louis. D. Engelmann. (US-TYPE)

Alabama: Conecuh Co.: Wet woods, 2½ mi. NE of Evergreen. Apr. 21, 1927. Harper #5. (US-1365880); Franklin Co.: Under sandstone cliffs. Harper 3399. (US-1632617); no county: Swampy place on Lookout

Mt. above Valley Head. May 22, 1899. Biltmore Herb. (US-724241).

Delaware: New Castle Co.: Delaware River. E.Hall ex Wm. Canby. (US-724235); Wilmington. Sept. 19, 1866. A. Commons. (US-154700); Wilmington, 1860. E.Tatnall. (GH); moist glade in woodland, pastured by cows, ¼ mi. SW of Ruthby Station. Sept. 21, 1947. Proctor 3100. (US-1917535); Staunton. June 1872. Wm. M. Canby. (GH- var. valida Engelm.).

Georgia: Floyd Co.: Lowland woods, Victory Lake, Mount Berry. June 16, 1939. Harold C. Jones. (UGa-19890); Jasper Co.: In running water of creek, draining "Flatwoods", 3½ mi. S of Monticello, Piedmont Prov. Apr. 25, 1952. Wilbur H. Duncan 13420. (UGa-50693); meadow bordering Central of Ga. R.R. tracks, 3½ mi. S of Monticello. Apr. 23, 1950. G.W.McDowell 594. (DUKE-138814 and UGa-52352); Fulton Co.: In pond, 1 mi. from Emory Univ. Campus. May 9, 1937. Don Eyles. (UGa-14126).

Maryland: Cecil Co.: Between tidal levels, gravelly and stoney east shore of Susquehanna River near its mouth, at Frenchtown. Sept. 7, 1948. Geo. R. Proctor 3605. (US-1917542); Montgomery Co.: Ditches along pathway near Great Falls. May 29, 1909. C.S.Williamson. (UConn.- var. valida); Prince Georges Co.: Border of pool in bottomland woods, NW of Snowdon Hall, Patuxent Research Refuge. July 10, 1941. F.M.Uhler & R.C.Erickson. (Fish & Wildlife Research Herb., Patuxent); Bottomland slough, Patuxent Research Refuge. June 2, 1937. Neil Hotchkiss 5175. (Fish & Wildlife Research Herb., Patuxent); bare bottom of bottomland run, Patuxent Research Refuge. June 24, 1938. Neil Hotchkiss 5909. (Fish & Wildlife Herb., Patuxent); Frederick Co.: Meyersville. Forrest Shreve 1797. (Plant Life of Md. - as var. valida); Garrett Co.: Crellin. Forrest Shreve 1903. (Plant Life of Md. - as var. valida).

North Carolina: Ashe Co.: Bares Pond, 2 mi. NE of Glendale Springs. Aug. 21, 1949. Radford 4939. (UMinn-536025; U.NC-50277; U.NC-47764); Caldwell Co.: Farm pond, 4 mi. N of Lenoir near Rt. NC 18. Aug. 23, 1949. Radford 4962. (U.NC-50265); Chatham Co.: Swamp forest, 4 mi. N of Merry Oaks. May 18, 1960. Radford 42861. (U.NC); Rt. 15-501, S of Mt. Carmel Church, road cut-off, E of Farrington Rd., near Clearwater Lake back to Chapel Hill. Apr. 22, 1949. (U.NC-47763); shallow pool, 3.5-4 mi. S of Chapel Hill. Apr. 22, 1949. Radford 3081. (U.NC-50318; Forsyth Co.: Weavers Lake near Rt. 421, W of Kernersville. Aug. 23, 1949. Radford 4964. (U.NC-50217); Granville Co.: Swamp forest, 8 mi. NE of Granville-Wake Co. line, on Rt. US 15. Apr. 17, 1956. Radford 10483. (U.NC); Guilford Co.: On R.M.Causey Farm, Liberty. May 9, 1937. Lane Barksdale. (U.NC-13137 and94205); Haywood Co.: Medford Pond, Lake Junaluska. June 28, 1931. H.L.Blomquist 1709. (DUKE-11311); pool on Big Cataloochee River, Great Smoky Mt. Nat. Park. July 11, 1939. H.C.Bold. (DUKE-

MAP 1A. ISOETES
ENGELMANNII
var. ENGELMANNII

57113 and 11323); moist lowland, formerly pond bed, near Medford Farms. June 20, 1935. M.E.Humphrey & F.T.Rome 54. (DUKE-32889); Cataloochee Pond, Great Smoky Mt. Nat. Park. Aug. 14, 1936. Lane Barksdale. (U.NC-13139); Alexander's Pond, elev. 2200 ft., Cataloochee. Lane Barksdale. (DUKE-35077); at edge of pond, elev. 2500 ft., Cataloochee. Aug. 1, 1936. Lane Barksdale & H.M.Jennison 3222. (U.Tenn); on the edge of Alexander's Pond in the Cataloochee, Cove Creek P.O., elev. 3400 ft. Aug. 1, 1937. Lane Barksdale. (U.NC-13138); Henderson Co.: Wet alluvial soil below dam, Kanuga Lake, Hendersonville. July 5, 1937. H.I.Blomquist 9701. (DUKE-42752); 1.5 mi. S of Flat Rock in brooklet, the basal part submerged. May 3, 1927. E.T.Wherry. (US-1289439); moist shady woods along RR, N of Hendersonville. June 28, 1936. H.J. Oosting 3676. (Butler Univ.-31699, leaves 36 cm. long, 15-20 leaves per plant; U.Ga-11585); wooded bog, 5 mi. N of Hendersonville. June 28, 1936. Pyron-NC78. (U.Ga-12095); very abundant in the mud of a drained lake, 3 mi. SW of Hendersonville. Oct. 17, 1953. O.M.Freeman 53590. (U.NC; REED); black muck near shore of Wolf Lake, 5 mi. W of Hendersonville on Crab Creek Road. Aug. 9, 1949. Radford 4838. (U.Minn-536023; U.NC-47756; U.NC-50268); Iredell Co.: Bog, 3.2 mi. W of Har-Harmony. May 14, 1949. Radford 2647. U.NC-47758; U.Minn-536014); Jackson Co.: In mud of shelf below upper falls, Whitewater Falls. July 25, 1958. W.B.Schofield & R.M.Schuster 9381. (DUKE-145652); Sunset Camp near Wilmot. July 9, 1936. J.E.Benedict 3441. (U.ND- leaves up to 40 cm. long, 30-40 leaves per plant); Jones Co.: Marsh on Hunting Creek near road to Maysville. June 27, 1951. Radford 5877. (U.NC; REED); Macon Co.: Minor Lake, W of Highlands. Aug. 4, 1949. Radford 4788. (U.NC-50326); Horse Cave, Highlands. July 14, 1934. J.K.Underwood, M.B.Wilson & Mrs. Lott 2796. (U.Tenn); submerged, Lake Sequoia, Highlands. June 15, 1940. H.L.Blomquist 11108. (DUKE-64405); bog in Horseshoe Cove, SE of Highlands. Aug. 11, 1948. R.L. Wilbur 1160. (DUKE-126169); Lake Sequoyah near Highlands. Aug. 4, 1948. Radford 4786. (.NC-50325); completely submerged in edge of Minor Lake by Bill Lippincott's house, near Highlands. July 14, 1939. Harold Bold. (U.NC-11334); Onslow Co.: Bank of New River, SW of Jacksonville, near Rt. US 258. Sept. 13, 1949. Radford 5053. (U.NC-50528); Pender Co.: Bog near junction of Rocky Point and Castle Hayne-Hampstead Road. June 1, 1950. Radford 5150. (U.NC-49259; U.Minn-536008); Person Co.: Bog, 3.3 mi. SSW of Roxboro. June 2, 1960. Radford 43196. (U.NC); Polk Co.: Marshy border of Tryon Reservoir in shallow water, 4 mi. W of Tryon Fall Creek Gulch, Pacolet River Valley, elev. 600 m. June 19, 1942. F.R.Fosberg 18920. (U.NC-28242); Rowan Co.: Peeler's Lake near Rt. US 52, N of Granite City. Aug. 19, 1949. Radford 4912. (U.NC50278 and 47757); Stokes Co.: Lake at Hanging Rock State Park. May 12, 1948. Radford 3065. (U.NC-35331); Swain Co.: Wet places, elev. 1700 ft. July 20, 1891. H.C. Beardslee. (U.Mnst. Ont. Herb.- 12761); Aug. 1891. H.C.Beardslee. (U.Minn-55696); Transylvania Co.: Roadside ditch at Balsam Grove. July 2, 1957. O.M.Freeman 57495. (U.NC; REED); in RR ditch near water tank, SW of Rosman. Summer 1923. H.L.Blomquist 1707. (DUKE-25265); Lake Sega, N of Rt. US 64 near Brevard. Aug. 8, 1949. Radford 4825. (U.NC-50330).

South Carolina: Pickens Co.: Springhead bog, 1.5 mi. E of Pickens. Sept. 22, 1956. O.M.Freeman 56758. (U.NC).

Tennessee: Cumberland Co.: Water, Obed River dam near Crossville. July 7, 1935. J.K.Underwood & A.J.Sharp 2855 and 3860. (U.Tenn) Obed River at Potter's Ford. Aug. 31, 1955. Frank Robinson. (U.Tenn); Grundy Co.: Immersed in shallow water of old swimming pool, 2 mi. S of Tracy City, Rt. 56. Aug. 28, 1943. Jamison & Shaver 4160. (U.Tenn); Jackson Co.: Shady Valley, in swamp, elev. 2800 ft. May 20, 1934. Jennison, Sharp & Underwood 763 and 860. (U.Tenn); Marion Co.: Submerged in water, Snake Pond, Cumberland Plateau, 10 mi. SE of Sewanee, elev. 1800 ft. July 13, 1938. H.K.Svensen 9511. (U.Tenn; Cal. Acad. Sci. 283708- leaves 70 cm. long, 20-25 leaves per plant); Morgan Co.: Clear Fork River, Rugley. May 31, 1934. H.M.Jennison 1118. (U.Tenn); Sullivan Co.: Near Holston Mt. May 1938. Herman O'Dell. (U.Tenn); Van Buren Co.: In moist sand above Cane Creek Falls, between Pikeville and Spencer. July 19, 1935. Sharp & Underwood 2839 and 4009. (U.Tenn).

Virginia: Giles Co.: Salt Pond Mt., Mountain Lake, elev. 4000 ft. Aug. 1890. Wm. M. Canby. (GH; US - as var. valida); growing in Mountain Lake, elev. 4000 ft. July 17, 1932. E.L.Core 4281. (UWVa); edge of lake, Mountain Lake. Aug. 15, 1934. H.L.Blomquist 3467. (DUKE-23958); growing in the lake, Mountain Lake. July 16, 1935. Velma Matthews. (U.NC-94206); Mountain Lake. Aug. 6, 1953. Wm. Cross. (UGa-60601); south end of Mountain Lake, Salt Pond Mt. July 22, 1956. R.F.Thorne 11313. (DUKE-137616; U.Iowa; UGa-56477); Salt Pond Mt., elev. 3870 ft., vic. Mt. Lake Biol. Station. Aug. 1, 1958. H.Iltis 19810. (U.Wisc.); Roanoke Co.: Forming solid stands in shallow open water in springy marsh, 3.5 mi. WSW of Salem P.O. July 12, 1946. Carroll E. Wood, Jr. 6190. (US); Madison Co.: Big Meadows Swamp, 4 mi. SE of Marksville, elev. 1040 m. F.R.Fosberg 34911. (US); Middlesex Co.: In mud at waters edge and in pools in swampy woods, along Piankatank River, 2 mi. N of Glenns Fork. May 29, 1921. E.C.Leonard & E.P.Killip 34. (US); Page Co.: Headwaters of Passage Creek, Massanutten Mts. Oct. 21, 1951. G.R.Fessenden. (US); Shenandoah Co.: Massanutten Mt. Sept. 21, 1941. Chapin & Fessenden. (US).

West Virginia: Berkeley Co.: Mt. Lake Lodge, Hedgesville. Sept. 16, 1945. H.Ison Shreve. (UWVa); Grant Co.: East side along a drain in wet field, Top of Alleghany Forest along Rt. 42, Scherr. July 19, 1942. H.I.Shreve. (UWVa); Hampshire Co.: Growing in mountain bog, Short Mt. Aug. 20, 1940. W.M.Frye & H.A.Davis 3459. (UWVa); Hardy Co.: Cacapon River. Aug. 1931. P.D.Strausbaugh. (UWVa); Mineral Co.: In a ditch, Sugar Camp, Kitzmiller's Farm, Sulphur. Aug. 1953. Melvin Brown. (UWVa); Monongalia Co.: Along edge of Tibbs Run Reservoir. Aug. 13, 1946. E.A.Bartholomew 53. (SABC-7th Dist., 603; UWVa; US; UGa-31719; TEX-38939; Univ. Coimbra Portugal; U.NC-138019; U.Tenn); Morgan Co.: Spruce-pine Hollow, along Rt. 9. July 3, 1942. H.I.Shreve. (UWVa); close shady Grove Park, Berkeley Springs. July

7, 1937. Ralph Barton. (Cal. Acad. Sci.-283720); Pocahontas Co.: Thornwood. July 12, 1939. Mr. & Mrs. H.A.Davis 2606. (UWVa-plant with 131 green leaves); Preston Co.: Deep Hollow. June 1942. Charles Peck. (UWVa); Three Forks Creek. June 6, 1939. Mr. & Mrs. H.A.Davis 2604. (UWVa-plant with 127 green leaves); Taylor Co.: On exposed stony muddy shore of Tygart River, near Cecil. July 11, 1937. Neil Hotchkiss 4632. (Fish & Wildlife Service, Patuxent; US); Tucker Co.: In mountain bog between Thomas and Parsons. Aug. 5, 1950. Mr. & Mrs. H.A.Davis 9251. (UWVa); Upshur Co.: Kanawha Head. Sept. 1, 1937. Mr. & Mrs. H.A.Davis 1247. (UWVa); Buckhannon River. July 20,1933. P.D.Strausbaugh. (UWVa-megaspores reticulate in some specimens, not reticulate in others; intermediate with var. caroliniana).

1B. ISOETES ENGELMANNII var. CAROLINIANA Eaton, Fern Bull., 8: 60. 1900; Pfeiffer, Ann. Mo. Bot. Gard., 9: 207. 1922; Broun, Index North Amer. Ferns, 100. 1938; Reed Bol. Soc. Brot., 2a ser., 27: 25-26. 1953. Map 1B(dots).

Syn.: Isoëtes engelmannii forma caroliniana (Eaton) Eaton, Fern Bull., 11: 25. 1903; Clute, Fern Bull., 19: 55. 1908.

Georgia: DeKalb Co.: Along margin of Durand Pond, submerged. May 9, 1937. Don Eyles 1882. (DUKE-49818); Putman Co.: In 3 in. of water in wooded bottomland along Glady Creek, 5½ mi. NE of Eatonton in area called The Glades. Apr. 11, 1948. W.H.Duncan 7916. (US-2019419; UGa-50694); Rabun Co.: In shallow water of boggy area in White Pine-Rhododendron-Kalmia growth of Glades area. Aug. 14, 1949. W.H.Duncan 10101. (UGa-50695); Richmond Co.: Sandy bog, Augusta. July 20, 1901. A.Cuthbert 572. (U.Conn).

North Carolina: Alexander Co.: Bog, 1 mi. N of Schneider's Mill near Taylorsville. Sept. 5, 1949. Radford 4973. (U.NC-50531); Alleghany Co.: Shallow water in Lake Louise at Roaring Gap. Aug. 21, 1949. Radford 4926. (U.NC-50333); shallow water at the State Fish Hatchery, Roaring Gap. Aug. 21, 1949. Radford 4930. (U.NC-50215); same loc., May 14, 1949. Radford 4069. (U.NC-50322 and 47759); Avery Co.: Pools in creek bottom, 2.4 mi. SW of Frank, on Rt. 19E. July 24, 1959. H.E.Ahles 47426 with J.A.Duke. (U.NC); submerged, artificial lake between Linville and Montezuma Gap.Sept. 17, 1938. H.L.Blomquist 10490. (DUKE-50418); submerged in Wildcat Lake, SW of Banner Elk. Sept. 5, 1949. Radford 4975. (U.Minn-535988; U.NC-47766 and 50275); Beaufort Co.: Stream bank, near Rt. NC 33, 2 mi. WNW of Cox's Crossroads. May 17, 1958. Radford 33325. (U.NC;REED); Buncombe Co.: In cold boggy places near base of Craggy Mt. May 19, 1898. Biltmore Herh.-5564B. (US-335540); Cherokee Co.: Pool in old limestone quarry, N of Marble. Aug. 6, 1949. Radford 4810. (U.NC-50327); Clay Co.: Bog, Chatuge Lake, 3.5 mi. E of Hayesville. Aug. 21, 1956. Radford 16329. (UNC); abundant in temporary roadside pool, near Buck Creek Bridge on Rt. US 64. Aug. 5, 1949.

Radford 4698. (U.NC-47762 and 50271); small pool and bog, 12 mi. E of Hayesville near Rt. US 64. Aug. 5, 1949. Radford 4799. (U.NC-50270); Carroll Lake, 1.5 mi. SE of Mission. Aug. 22, 1952. Radford 6427. (U.NC-51927); Gaston Co.: Swamp, ½ mi. N of Steppes Gap, Kings Mt. June 12, 1934. E.T.Wherry. (UWVa; DUKE-24136); Graham Co.: Bog on Rock Creek, 1.5 mi. S of Robbinsville. Aug. 6, 1949. Radford 4813. (U.NC-50328); Haywood Co.: Pool on Big Cataloochee River. July 17, 1939. Harold Bold. (U.NC-11323); Henderson Co.: Moist shady woods along RR, N of Hendersonville. June 28, 1936. H.J.Oosting 3676. (DUKE-35406); Iredell Co.: Wet places in bog, 3 mi. NW of Harmony, N side of Rt. 901. June 8, 1955. Blomquist et al. 16633. (DUKE-160858); in wet boggy soil, below bog, 2 mi. W of Union Grove, Rt. 901. June 8, 1955. Blomquist et al. 16650. (DUKE-160861); Jackson Co.: Upper lake at High Hampton near Cashiers. Aug. 8, 1949. Radford 4820. (U.NC-50329); muddy bottom around margin of Cashiers Lake. Aug. 2, 1949. Radford 4754. (U.NC-47760 and 50274); Lake Sapphire near Cashiers. Aug. 3, 1949. Radford 4772. (U.NC-50274); Macon Co.: Muddy bottom of Country Club Lake, Highlands. Aug. 4, 1949. Radford 4778. (U.NC-47767 and 50272); McDowell Co.: State Fish Hatchery pool at Marion. Aug. 18, 1949. Radford 4884. (U.NC-50279); Mitchell Co.: Roandale Farm. Aug. 1, 1895. A.G.Wetherby 135. (US-273397); edge of fish-pond, half-submersed or less, gravel bottom. Aug. 15, 1898. A.G.Wetherby. (U.Minn-55697, "Cotype" on sheet). Acc. to Pfeiffer, near Salisbury; muddy bands or partly in water, headwaters of Big Rock Creek, Magnetic City. Aug. 15, 1898. A.G.Wetherby. (U.NC-13140, 94204, 94203). See Blomquist, Amer. Fern Jour., 21: 90. 1931; Wetherby Place, Big Rock Creek, Roan Mt. Aug. 1893. W.W.Ashe. (U.NC-24428); Estes Pond, 1.5 mi. S of Spruce Pine on Rt. NC 26. Radford 4958. (U.NC-50266); Polk Co.: In bogs formed by cold springs on Spring Mt., near Columbus, elev. 3000 ft. May 5, 1897. Biltmore Herb. 5564. (US-331006; U.Minn-55694); Rutherford Co.: McCall's Lake, near Rt. NC 26, 2 mi. E of Burke Co. line. Aug. 18, 1949. Radford 4896. (U.NC-50332); Transylvania Co.: Rockhouse Camp Pool, 4 mi. S of Brevard. Aug. 8, 1949. Radford 4827. (U.NC-50269); Union Co.: Low wet cornfield, 1 mi. S of Stanley-Union Co. line, Rocky River, 4 mi. N of Unionville. May 3, 1956. Ahles 12028 and Radford. (U.NC; REED); Watauga Co.: Snyder's Lake, Blowing Rock. Aug. 22, 1949. Radford 4945. (U.NC-50267); Yancey Co.: Bog on Rt. NC 197, 1 mi. N of Pensacola. Aug. 22, 1949. Radford 4957. (U.NC-50216 and REED; U.NC-47765).

South Carolina: York Co.: Rush swamp in pasture, 2.5 mi. S of junction Rt. SC 274 and Rt. SC 577, 6.8 mi. N of Newport. April 14, 1957. Ahles 22947 and Haesloop. (U.NC).

Virginia: Dinwiddie Co.: Richwoods along Cattail Run, SE of Burgess Station. May 21, 1939. M.L.Fernald and Bayard Long 9797. (DUKE-60852; US; UWVa); Greensville Co.: Fontaine Creek, SE of Taylors Millpond. June 12-13, 1939. M.L.Fernald & B. Long 10079. (US); Southampton Co.: Forming carpets, argillaceous and siliceous

alluvium, bottomland of Nottaway River, near Courtland. June 23, 1936. Fernald, Long & R.F.Smart 5589. (U.Minn-450554; U.Wisc.;US); sandy alluvial bottomlands of True Creek, Drewryville. June 22-23, 1936. Fernald, Long & Smart 5589. (US); Cypress Bridge on Nottaway River. July 25, 1936. Fernald & Long 5974. (US); Sussex Co.: In silt of bed of brook, woods by Nottaway River, SW of Lambs. July 18, 1940. Fernald & Long 12222. (U.Ga-26580; US; GH); wooded bottomland, Jones Hole Swamp, W of Coddyshare. June 18, 1939. Fernald & Long 10081. (Cal. Acad. Sci.-283709; US); wooded bottomland, Tree Creek, SW of Grizzard. June 14, 1939. M.L.Fernald & B.Long 10080.(US).

1C. ISOETES ENGELMANNII var. GEORGIANA Engelm., Trans. St. Louis Acad. Sci., 4: 384. 1882; Reed, Bol. Soc. Brot., 2a ser., 27: 26. 1953. Map 1C(dots.).
Syn.: Isoëtes engelmannii forma georgiana (Engelm.) Clute, Fern Allies, 258. 1905.

Florida: Alachua Co.: In shallow water in margin of Sugarloaf Prairie near Gainesville. Jan. 6, 1947. Erdman West. (UGa-30783).

Georgia: Baker Co.: Common in up to 2 ft. of water in sluggish Big Cypress Creek, mostly submersed, elev. 130 ft. July 17, 1946. R.F.Thorne 1566. (UGa-24223; U.Tenn); Whitford Co.: Clayey soil in wet woods, eastern base of Taylor's Ridge, elev. 110 ft. July 26, 1900. Roland M. Harper 310. (US-384214); Floyd Co.: Mountain stream, Horseleg Creek, a tributary of Coosa River. A.W.Chapman. (TYPE).

North Carolina: Beaufort Co.: Stream on Chocowinity Creek, 5 mi. SE of Chocowinity. May 17, 1958. Radford 33304. (U.NC); Bladen Co.: Brown Swamp near Rt. US 701. June 14, 1950. Radford 5306. (U.NC-49285); Brunswick Co.: Sluggish stream, 0.6 mi. SE of Bolivia. June 2, 1950. Radford 5187. (U.NC-49258; in mud of slough in swamp, between Waccamaw River and Ash. June 2, 1937. D.S.Correll & H.L.Blomquist 7366. (DUKE-71279); moist mucky soil, Lockwood's Folly, E of Supply. July 11, 1960. Mrs. Forrest et al. (DUKE-145721); black mud on stream bank, 0.4 mi. SW of Supply. June 2, 1950. Radford 5178. (U.NC-49256; U.Minn-536010); black mud on creek bank, 4 mi. W of Winnabow. June 2, 1950. Radford 5176. (U.NC-49257); Carteret Co.: Marsh on creek, 4 mi. S of Kuhns. June 27, 1951. Radford 5873. (U.NC); Columbus Co.: Boat Landing, Livingston Creek near Freeman. Sept. 1932. Miss. Gertrude Grimsley. (DUKE-11310); swamp near Rt. NC 130, 5 mi. SE of Old Dock. June 14, 1950. Radford 5323. (U.NC-49287); Craven Co.: Batchelder Creek near Rt. US 70. June 12, 1949. Radford 4435. (U.NC-50324); Core Creek near Rt. US 70. June 12, 1949. Radford 4432. (U.NC-50323); Edgecomb Co.: Stream bank near Rt. NC 43, 3 mi. W of Pinetops. May 27, 1958. Radford 34021. (U.NC); Harnett Co.: Moores Creek near Rt. NC 53. April 23, 1949. Radford 4013. (U.NC-50321); Johnston Co.: Black muddy creek bank, 2 mi. N of Smithfield near Wilson Mills Road. May 19, 1950. Radford 5132. (U.NC-49271); Jones Co.: Bank of White

MAP 1B. ISOETES
ENGELMANNII
var. CAROLINIANA

MAP 1C. ISOETES
ENGELMANNII
var. GEORGIANA

Oak River, 5 mi. N of Haywood Landing. June 28, 1951. Radford 5886. (U.NC); Onslow Co.: Creek bank, 1 mi. NW of Rt. NC 53 and US 258 junction. Sept. 13, 1949. Radford 5051. (U.NC-50529); Pamlico Co.: Swamp near Upper Broad Creek and Rt. NC 55, 0.6 mi. W of Olympia. July 5, 1958. Radford 35792. (U.NC); Pender Co.: Creek bank, 1.6 mi. E of Northeast Cape Fear River near Rocky Point, Hampstead Road. June 1, 1950. Radford 5147. (U.NC); Sampson Co.: Bog along Six Runs Creek near Rt. US 421. April 23, 1949. Radford 4008. (U.NC-50320).

South Carolina: Berkeley Co.: Swamp near Rt. SC 511 in Santee Exp. Forest. June 15, 1950. Radford 5337. (U.NC-49286); Dorchester Co.: In mud in stagnant stream bed and on banks, dense forest swamp, S of Summerville. June 16, 1936. D.S.Correll 5367. (UGa-15704; US-1727433; DUKE-37019; REED); Lexington Co.: Open stream bank, Savany Hunt Creek, 3.5 mi. NE of Gaston. May 27, 1957. Radford 23387. (U.NC-154298 and 102228; DUKE-143013, leaves 50-55 and 45-55 cm. long, sporangia brown spotted); Marlboro Co.: About 5 mi. from Drakes Mill Pond, in small stream. April 12, 1939. Velma Matthews. (U.NC-10362).

2. ISOETES FLACCIDA Shuttlew.; A.Br., Flora, 29: 178. 1846; Amer. Jour. 3: 2. 1847; Chapman, Fl. Southern United States, ed. 1, 602. 1860; ed. 2, 602. 1889; Engelm., Trans. St. Louis Acad. Sci., 4: 386. 1882; Pfeiffer, Ann. Mo. Bot. Gard. 9: 136-138. 1922; Broun, Index N. Amer. Ferns, 100. 1938; Correll, Amer. Fern Jour., 28: 99. 1938; Reed, Index Isoetales, Bol. Soc. Brot., 2a ser., 27: 26. 1953. Map 2 (dots).

Syn.: Isoëtes flaccida var. rigida Engelm., Trans. St. Louis Acad. Sci. 4: 386. 1882; Isoëtes flaccida var. chapmanii Engelm., Trans. St. Louis Acad. Sci. 4: 386. 1882; Isoëtes chapmanii (Engelm.) Small, Ferns of Florida, 133. 1918; Ferns of Florida, 222. (1931) 1932; Calamaria flaccida (Shuttlew.) Kuntze, Rev. Gen. Pl. 2: 828. 1891-93; Isoëtes alata Small, Ferns of Florida, 133. 1918; Isoëtes flaccida var. alata (Small) Pfeiffer, Ann. Mo. Bot. Gard. 9: 137. 1922; Isoëtes flaccida forma chapmanii (Engelm.) Clute, Fern Allies, 258. 1905; Isoëtes flaccida forma rigida (Engelm.) Clute, Fern Allies, 258. 1905.

Florida: Citrus Co.: Pond flat near residence of R.R.St.John, Floral City. April 3, 1938. G.H.Conklin 905. (U.Wisc.); in dried-up pond about ½ mi. E of Floral City. April 6, 1938. R.T.Clausen & H.Trapido 3339. (Penn State- as var. alata); Dade Co.: In hammocks between Cocoanut Grove and Cutler. Nov. 13-23, 1903. J.K.Small & J.J.Carter. (NY; U.Minn-260860); Duval Co.: Jacksonville. (US); Franklin Co.: Frequent locally on sandy-muck and shallow standing water of apalachicola River bank, 1-3 mi. N of RR bridge crossing, NW of Apalachicola. June 29, 1956. R.Kral & P.L.Redfearn 2744. (DUKE; REED); Hernando Co.: Growing in dense patches in a few inches of water, firm sand bottom in shallow pond, near Rt. US 98, 7 mi.

SE of Brooksville. May 7, 1954. F.M.Uhler & Neil Hotchkiss 7409. (Fish & Wildlife Research, Patuxent; REED); frequent, submersed in 2.5 ft. of slowly flowing clear water, 0.5 mi. E of Brooksville. Aug. 24, 1938. R.Kral 7978. (UGa-60156); Jackson Co.: Inundated in a spring-run along Chipola River, Marianna. May 11, 1956. R.K.Godfrey 54782 & H. Kurz. (DUKE-165768; U.Tenn); Jefferson Co.: In shallow water of pool, sandy woods near Newport. April 10, 1961. E.J.Palmer 38493. (US); Leon Co.: Bank of drain from Munson's Pond, 7 mi. S of Tallahasse. April 19, 1925. R.M.Harper 22. (US); Manatee Co.: Manatee. April 1878. A.P.Garber. (US;UWVa); Pinellas Co.: Wayside Aquatic Gardens, 3515 Obispo St., Tampa. Mar. 16, 1936. Manuel Nosti. (U.NC-94207); brackish banks of Hillsboro River, N of Hillsboro Ave., Tampa. Dec. 11, 1935. Manuel Nosti. (U.Fla; U.NC-146172); Sumter Co.: Wet pine barrens, in 1-2 in. water, Eocene formation. July 5, 1905. Roland M. Harper. (US-as var. rigida); 4 mi. NE of Coleman. July 9, 1938. Phillips, Woodbury, Buswell & St.John. (US); margin of shaded pond, Riverland. July 23, 1900. A.H.Curtiss 6696. (U.Minn-55707, as var. alata); Wakulla Co.: Amphibious in peaty muck, shores of Wakulla River at Lower Bridge. June 27, 1955. R.K. Godfrey 53538. (DUKE-136114 and 160529); in shady sandy mucky bottom, Newport, St. Marks River. Aug. 11, 1933. Neil Hotchkiss 4514. (Fish & Wildlife Research, Patuxent); Without county indicated: Lake Flint. Aug. 1878. A.P.Garber. (Univ. Coimbra; US); open miry places, in Turnbull Swamp, Halifax River. May. A.H.Curtiss 3813. (Cal. Acad. Sci.-187082); edge of swamp near canal, Palm Valley. April 26, 1940. Mary W. Diddell. (US, as var. alata).

Georgia: Baker Co.: Common in up to 2 ft. of water in sluggish Big Cypress Creek, mostly submersed, elev. 130. ft. July 17, 1946. R.F.Thorne 1566. (UGa-37558, not UGa-24223); Bullock Co.: In sluggish pine barren stream. June 10, 1901. Roland M. Harper 843. (US-as var. alata); Coffee Co.: Sluggish pine barren stream, E of Douglas. July 19, 1901. R.M.Harper 1429. (US); Laurens Co.: (US); Miller Co.: Shallow running water of Big Drain, just above Babcock Pond. Mar. 23, 1949. R.F.Thorne & W.C.Muenscher 9114. (UGa-38329); Sumter Co.: Cypress pond near Cobb. July 11, 1901. R.M.Harper 1046. (US, as var. alata).

3. ISOETES MELANOSPORA Engelm. in Oaks of United States, 2: (nota). 1877; Trans. St. Louis Acad. Sci. 3: 395. 1877; l.c., 4: 383. 1882; Baker, Jour. Bot. 18: 69. 1880; Motel. & Vendr., Actes Soc. Linn. Bord., 36: 359. 1883; Chapman, Fl. Southern United States, ed. 2, 672. 1889; Small, Fl. Southeastern United States, 25. 1903; Pfeiffer, Ann. Mo. Bot. Gard., 9: 134. 1922; Broun, Index N. Amer. Ferns, 102. 1938; Reed, Bol. Soc. Brot., 2a ser., 27: 41. 1953. Map 2 (plus).
Syn.: Calamria melanospora (Engelm.) Kuntze, Rev. Gen. Pl., 2: 828. 1891-93.

Georgia: DeKalb Co.: Stone Mt. (matured in lab.). April 17, 1891. L.M.Underwood. (DUKE-61817); raised from plants collected on Stone Mt. 1898. Henry Eggert. (U.Minn-55736); in shallow depressions on the summit of little Stone Mt. May 15, 1897. Biltmore Herb. 4264B. (U.NC-94208; U.Minn-55737); Stone Mt. Nov. 14, 1915. W.G.Webb. (UGa-11230; DUKE-32561); shallow pool in granite, summit of Stone Mt. Dec. 8, 1935. Pyron & McVaugh 355. (UGa-16385 and 18177); in shallow mud puddle on summit of Stone Mt. Aug. 18, 1936. D.S.Correll 6584. (UGa-15703; DUKE-6584; US; REED); in shallow pools on granite, associated with Amphianthus, Stone Mt. Mar. 5, 1939. Pyron 132. (UGa-17915); growing submerged in shallow pools of water on bare granite surface of summit of Stone Mt. Mar. 28, 1950. J. Hansen 2134. (UGa-52353); in mud and water of shallow excavations in granite rock on summit of Mt. Arabia, 3 mi. S of Lithonia. Sept. 10, 1937. D.S. Correll 8390. (DUKE-42160; US); Mar. 16, 1939. F.J.Hermann 10173. (US); Apr. 19, 1947. H.R.Totten. (U.NC-29488); Apr. 21, 1947. A.J.Sharp & Norman Russell 2457. (U.Tenn); Apr. 19, 1956. W.D.Burbanck & F.H. Bormann. (U.NC-138246; UWVa; US; REED; SABC 1401, 15th Dist.); Rock Chapel Quarry near Lithonia. Don Eyles. (No date). (UGa-16454;REED).

South Carolina: Lancaster Co.: Granite outcrop, Forty Acre Rock, 9 mi. N of Kershaw. April 15, 1957. H.E.Ahles 23110 & J.G. Haesloop. (U.NC;REED).

4. ISOETES BUTLERI Engelm., Bot. Gaz. 3: 1. 1878; Baker, Jour. Bot. 18: 105. 1880; Broun, Index N. Amer. Ferns, 99. 1938; Reed, Bol. Soc. Brot., 2a ser., 27: 18. 1953. Map 38(dots).
   Syn.: Calamaria butleri (Engelm.) Kuntze, Rev. Gen. Pl. 2: 828. 1891-93; Isoëtes arkansasa Engelm., in sched. (Penn. State herb.); Isoëtes butleri var. immaculata Engelm., Trans. St. Louis Acad. Sci. 4: 388. 1882; Isoëtes butleri forma immaculata (Engelm.) Clute, Fern Allies, 258. 1905; Fern Bull. 16: 54. 1909.

Alabama: Franklin Co.: Small flat cedar glade just N of Isbell. April 25, 1942. Roland M. Harper 3877. (US-originally label-I. virginica, but look more like I. butleri).

Arkansas: Carroll Co.: Limestone glade, 3.7 mi. W of Green Forest. Apr. 18, 1940. N.C.Fassett 20585. (U.Wisc); Conway Co.: Petit Jean Mt., Morrilton P.O. July 4, 1955. Jewel E.Moore 969 and May 21, 1955. Jewel E. Moore 486. (U.Tenn); Logan Co.: Seepy glade, Magazine Mt., Ozark Nat. Forest, elev. 2800 ft. May 9, 1942. Delzie Demaree 22849. (U.Minn-379706); Saline Co.: Bauxite Glades, near Bauxite, elev. 280 ft. May 17, 1942. Delzie Demaree 23029. (US); Benton Co.: "Martins Bluff", sandstone cliffs above White River, 15 mi. NE of Fayetteville, elev. 1000-1200 ft., Ozark Plateau. May 22, 1942. D.M.Moore 400-257. (U.Wisc.).

Missouri: Jefferson Co.: Stoney Hills. May 26, 1891. H.Eggert. (U.Minn-55634 and 55636; var. immaculata Engelm., U.Minn-55635 and 55637); May 11, 1896. H.Eggert. (U.Minn-55638); DeSoto. May 25, 1896. H.Eggert. (U.ND; TEX-38968; Cal. Acad. Sci.-183222); Montgomery Co.: St. Peter sandstone glade along Rt. 40, just E of Mineola. May 24, 1948. J.A.Steyermark 65427. (US-2126758; REED); Eagle Rock, common on limestone ledges. June 3, 1897. B.F.Bush 107. (U.Minn-55639); Jasper Co.: Limestone seepy glades, Joplin, elev. 900 ft. July 5, 1957. Delzie Demaree 39301. (US); Steyermark, l.c., p. 11, map 9. 1963) distinguished I. butleri from I. melanopoda, and indicates the following counties on the map: Lincoln, St. Louis, Jefferson, Perry, Shannon, Montgomery, Warren, Gasconade, McDonald, Barry, Stone, Taney, Ozark, Christian, Lawrence, Greene, Jasper, Bates, Dade, Cedar, Polk, Hickory, Benton, Wright and Morgan.

Tennessee: Davidson Co.: Springy places in cedar barrens, vic. Nashville, near Lavergne. April (no date). A.Gattinger. (U.Tenn, as var. immaculata Engelm.); same loc. May (no date). A.Gattinger 3212. (U.Minn-55738); same loc. Mar. 30, 1934. L.R.Hesler 116. (U.Tenn); same loc. Mar. 31, 1934. Hesler, Bold & Sharp 114. (U.Tenn.); Rutherford Co.: Wet rocky soil in cedar glade, 4 mi. NE of Lavergne. May 17, 1947. E.Quaterman. (TEX-38938); limestone barren opp. Stones River Mil. Park, N of Murfreesboro. May 16, 1959. A.J. & E.Sharp 25916. (U.Tenn); limestone barrens, 5 mi. N of Murfreesboro on Nashville highway. May 10, 1948. A.J.Sharp & A.C.Koelling 23142. (U.Tenn); Williamson Co.: Cedar glade on first road N of Rutherford Co. line, off Rt. US 41. May 11, 1952. Jesse M. Shaver 10964. (U.Tenn; REED); Hillsboro Road, 6.2 mi. S of Davidson Co. line. May 11, 1952. Jesse M. Shaver 10962. (U.Tenn); Wilson Co.: Cedar Barrens, Vesta. Apr. 22, 1936. H.K.Svensen 7749. (U.Tenn).

Kansas: Cherokee Co.: Rocky soil. May 1897. Hitchcock 1068. (US).

Oklahoma: Atoka Co.: Limestone Gap, on alkali flats. June 16, 1877. Butler. (US); other records given by Pfeiffer from this locality; Cleveland Co.: Buffalo Wallows, 3 mi. E of Norman. Apr. 27, 1934. Geo. J.Goodman 2108. (US); Comanche Co.: Craterville, Wichita Mts., in pool of water on granite boulders. Elbert L.Little, Jr. July 16, 1932. (US, as var. pallida); Choctaw Co.: G.D.Butler, in 1875. Indian Territory. (Penn State, as Isoëtes arkansasa Engelm., n.sp.).

5. ISOETES MELANOPODA Gay et Dur., Bull. Soc. Bot. Fr., 11: 102. 1864; Engelm., Bot. Gaz. 3: 1. 1878; Baker, Jour. Bot. 18: 105. 1880; Fern Allies, 128. 1887; Motel. & Vendr., Actes Soc. Linn. Bord. 36: 372, t. 14, f. 1-3. 1883; Eaton in Gray's Manual, ed. 7, 61. 1908; Pfeiffer, Ann. Mo. Bot. Gard., 9: 149.

1922; Broun, Index N. Amer. Ferns, 102. 1938; Reed, Bol. Soc. Brot., 2a ser., 27: 40-41. 1953. Map 3A(dots).

Syn.: Calamaria melanopoda (Gay & Dur.) Kuntze, Rev. Gen. Pl. 2: 828. 1891-93; Isoëtes melanopoda var. pallida Engelm., Trans. St. Louis Acad. Sci. 4: 387. 1882; Eaton in Grays Manual, ed. 7, 61. 1908; Little, Jr., Amer. Fern Jour. 23: 94. 1933; Isoëtes melanopoda forma pallida (Engelm.) Clute, Fern Allies, 260. 1905; Fernald, Rhodora 51: 103. 1949; Reed, Bol. Soc. Brot., 2a ser., 27: 41. 1953. (Texas).

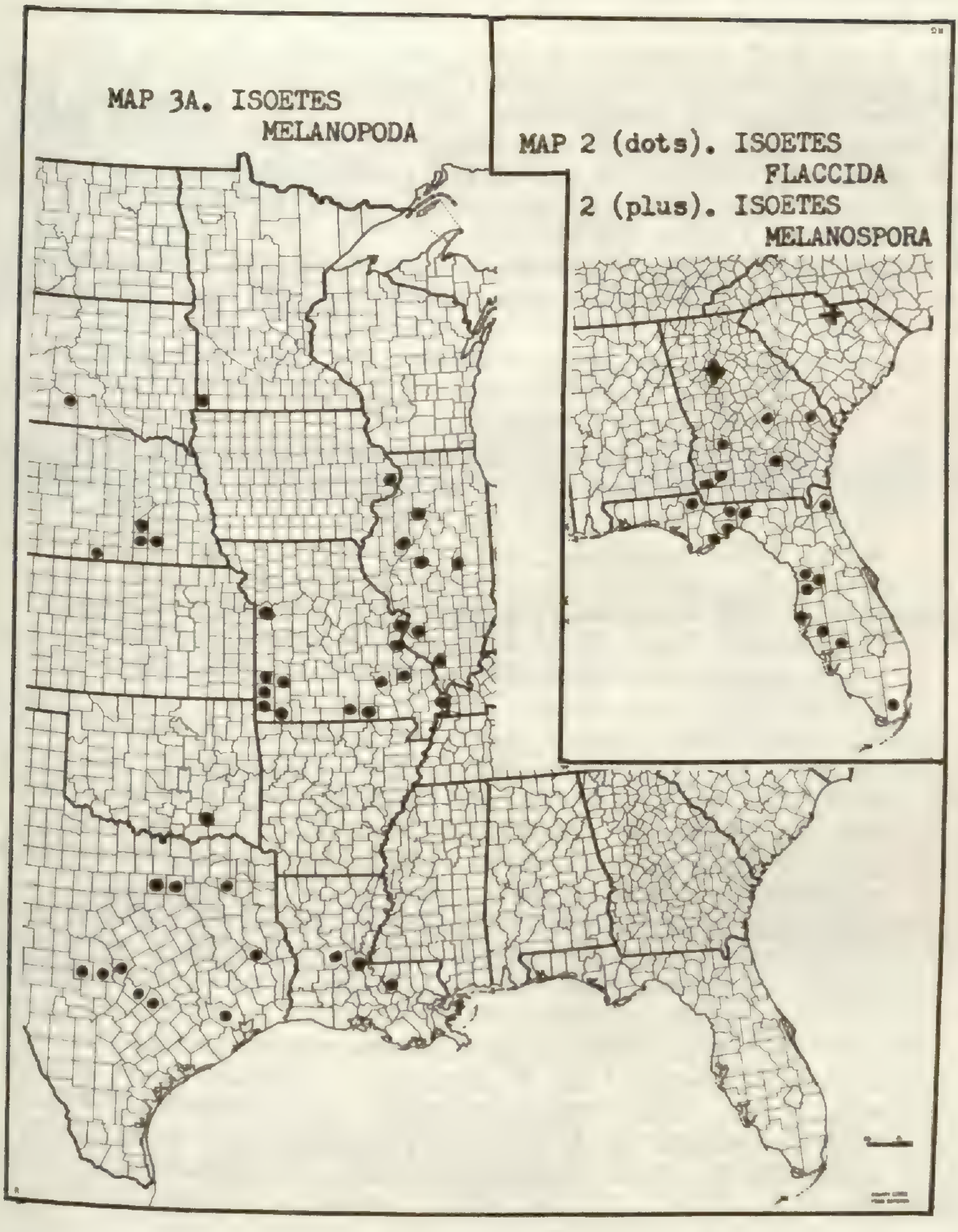
Illinois: Menard Co.: Athens. 1853. Elihu Hall. (TYPE); Athens. Nov. 1865. A.B.Seymour. (DUKE-61821); Piatt Co.: Dried-up swamp along RR, NW of Monticello. June 9, 1953. H.E.Ahles 7389. (DUKE-164705; U.Tenn; US; U.Minn-529328); St. Clair Co.: Lakes. June 10, 1882. H.Eggert. (U.Minn-55742); Stark Co.: Drying bed of shallow pond near Wady Petra. July 26, 1898. V.H.Chase. (U.Minn-406404 and 378967; Penn State); "Illinois". June 26, 1866. E. Hall. (Penn State); Jackson Co.: Along wet roadside ditch, Rt. 3, 7 mi. SW of Murphysboro. June 13, 1955. Robt. H. Mohlenbrock, Jr. 5385. (US); in inundated ditch, 3 mi. S of junction of Rt. 3 and 144, 1 mi. S of Worthen Bayou. June 13, 1955. Robt. H. Mohlenbrock, Jr. (Amer. Fern Jour. 50: 181-184. 1960).

Iowa: Clinton Co.: Clinton on Mississippi River. 1863. Vasey. (MO;GH).

Louisiana: See C.A.Brown, Ferns and Fern-allies of Louisiana, pp. 162-163. 1942. Avoyelles Parish: Marksville. 1939. C.A.Brown & Lenz 7521 (LSU); East Baton Rouge Parish: Plains. 1939. C.A.Brown 7493. (LSU); Rapides Parish: Holloway Prairie. 1939. C.A.Brown & Lenz 7522. (LSU).

Minnesota: Rock Co.: In mud at edge of pool on quartzite outcrop, 3 mi. N of Luverne. July 8, 1945. J.W.Moore & R.M.Tryon, Jr. 17557. (U.Minn-387780; TEX-38969); 3¼ mi. N of Luverne. July 8, 1945. Moore & Tryon, Jr. 17559. (U.Minn-387779); 4 mi. NNW of Luverne, corm 1-2 in. deep in wet sod at edge of pond on quartzite outcrop in a pasture. July 8, 1945. Moore & Tryon, Jr. 17882. (U.Minn-387778).

Missouri: Barton Co.: Wet sandy margins of small stream on upland prairie, 5 mi. NE of Iantha. May 5, 1955. E.J.Palmer 59761. (U.Wisc.); Jackson Co.: Low prairies, local. July 10, 1898. K.K. Mackenzie 235. (U.Minn-260855); same loc. June 2, 1897. (U.Minn-55740); low prairies, Dodson. July 17, 1900. K.K.Mackenzie. (U.Wisc-13230); Dodson. June 23, 1898. B.F.Bush 35. (US); ditches along Little Blue, E of Independence. May 24, 1896. Kenneth K. Mackenzie. (U.Conn); St. Louis Co.: Lakes, St. Louis. June 1881. H.Eggert. (U.Minn-55741); Steyermark (Flora of Missouri, pp. 10-11, map 8. 1863) indicates the following counties: Jackson, St. Louis, Washington, Mississippi, Madison, Reynolds, Oregon, Howell, Newton, Jaspar, Barry and Dade.


MAP 3A. ISOETES
MELANOPODA
MAP 2 (dots). ISOETES
FLACCIDA
2 (plus). ISOETES
MELANOSPORA

Nebraska: Clay Co.: Growing in lowlands on Loess Plains, 3 mi. SE of Fairfield, on Scott soils. July 5, 1941. Wm. L. Tolstead 41581. (Penn State); Fillimore Co.: Growing in depressions on Loess Plains, 1 mi. W of Fairmont, on Scott soil loam. July 21, 1941. Wm. L. Tolstead 41579. (Penn State); Hamilton Co.: Growing on Loess Plain, near Aurora, on Scott soils. July 21, 1941. Tolstead 41583. (Penn State); Harlan Co.: In depression on the Loess Plain, NE corner of county, growing on mud flat, formerly covered with 2-6 in. of water. Sept. 5, 1941. Tolstead 41584. (Penn State).

Oklahoma: Atoka Co.: Limestone Gap, in alkali flats. (US;MO). See Pfeiffer, same localities given for I. butleri and I. melanopoda.

South Dakota: Mellette Co.: Waterhole, side of highway in eastern part of county. July 10, 1924. W.H.Over 15878. (U.SD-15878;US).

Texas: Bastrop Co.: In buffalo wallow or sink with Marsilea, sandy pinelands upland. Mar. 11, 1944. B.C.Tharp & Fred A.Barkley 4013. (TEX-38958 and 38961); Bastrop. May 9, 1921. B.C.Tharp. (TEX-38965); May 7, 1931. C.H.Muller A2a. (TEX-38962); Burnet Co.: Near top of Granite Mt., shallow depressions in granite. May 7, 1941. G.M.Soxman 448. (TEX-sine no.); Dallas Co.: Low wet area, among sedges and grasses, 7 mi. SE of Dallas, Rt. 175, elev. 400 ft. May 22, 1941. G.M.Soxman 452. (TEX-38956 and 38960; UWVa;REED); off Rt. 175 between Eleum and Seagoville, in bog. May 16, 1944. Helen I. Wilfong 81. (TEX-38964); Llano Co.: Near S base of Enchanted Rock, small deep pool, 75% submerged. May 8, 1941. G.M.Soxman 451. (TEX-38959); at foot of rock along intermittant stream, Enchanted Rock. May 5, 1940. B.C.Tharp XY. (TEX-38945, det. by D.S.Correll as I. lithophila); in small pool of water with mucky bottom, by stream at base of mountain by Enchanted Rock. May 18, 1947. Wm.Krodel, B.C.Tharp & F.A.Barkley 17T278. (TEX-38951, det. by F.A.Barkley and ver. by D.S.Correll as I. lithophila; very similar to I. melanopoda var. pallida); Enchanted Rock, growing in brook at base of mountain. Apr. 12, 1931. C.H.Muller Ala. (TEX-38963, det. C.V.Morton); Mason Co.: Shallow soil about rolling granite outcrops, abundant in seepage at edge of small stream, 7 mi. N of Mason on Katemcy Road, old leaf bases black. May 14, 1947. Rogers McVaugh 8322. (TEX-38957 and 178402, with tendencies to I. butleri); Tarrant Co.: Fort Worth, springy bank. May 8, 1905. Robert Bebb 2485. (U.Minn-299227; U.Wisc-21365).

Isoëtes lithophila Pfeiffer (Ann. Mo. Bot. Gard., 9: 135-136. 1922) is another member of the melanopoda-complex. It is very similar to I. melanospora in many respects, as living in shallow granitic depressions on mountains (but only in Texas), the sporangium completely covered by the velum, stomata present, sporangium orbicular (to oblong) and slightly larger, ligule cordate-triangular. In several other characterists it differs sufficiently to be kept as a separate

species in the melanopoda-complex. However, it is found in Texas in Burnet and Llano Coutnies associated with Isoëtes melanopoda on Granite Mt. and at Enchanted Rock.

Texas: Burnet Co.: In shallow depression in granite on east slope of Granite Mt. May 9, 1914. McAllister. (TYPE: MO;NY; ISOTYPE: TEX-38967); SE base of Granite Mt. Nov. 30, 1940. G.M.Soxman 428. (TEX-38949); G.M.Soxman 428c. (TEX-38950; REED); same loc. May 5, 1941. G.M.Soxman. (TEX-38944); near top of Granite Mt. in shallow pool. Nov. 7, 1941. elev. 850 ft. G.M.Soxman 448a. (TEX-38948); Llano Co.: Growing in depressions on granite on top of mountain, Enchanted Rock. May 1, 1930. C.H.Muller A3a. (TEX-38946); Enchanted Rock. April 30, 1938. Eula Whitehouse XI. (US-1871690; REED); same loc. and date. B.C.Tharp. (TEX-38951); Enchanted Rock. May 17, 1940. B.H.Warnock 20565. (TEX-38942); shallow depression in granite, near top of Enchanted Rock. May 8, 1941. G.M.Soxman 450. (TEX-38953); in shallow pool in granitic sand in pocket of granite near summit of Enchanted Rock. May 18, 1947. B.C.Tharp, Addison Lee & Fred A.Barkley 17T305. (TEX-38943).

6. ISOETES VIRGINICA Pfeiffer, Claytonia, 3: 29-30. 1937; Broun, Index N. Amer. Ferns, 104. 1938; Reed, Bol. Soc. Brot., 2a ser., 27: 56. 1953. Map 4A(dots).

Georgia: Laurens Co.: Bare exposed mud flats in branch swamp, in deep shade, 2 mi. SW of Cadwell. June 3, 1947. McVaugh 8620. (TEX-178239 and 38941); Macon Co.: Along edge of shallow pond, F.M.Carson Farm, 15 mi. N of Oglethorpe. Aug. 4, 1941. Joseph H.Pyron 857. (DUKE-135334).

North Carolina: Caswell Co.: Bog, 1 mi. N of Frogsboro. June 4, 1960. A.E.Radford 43252. (U.NC;REED); Chatham Co.: Alluvial woods on New Hope River, 3 mi. NE of Haw River Junction. May 12, 1955. A.E.Radford 8415. (U.NC, leaves about 20, 25-28 cm. long); Columbus Co.: On Livingston's Creek at Boat Landing, near Freeman. (Spec. sent to Dr. N. Pfeiffer, who thought it to be I. eatoni). Miss Gertrude Grimsley. Discussed by Blomquist, Ferns of N.C., p. 123. 1934; Duplin Co.: Black muddy bank of Rockfish Creek, 2 mi. W of Wallace near Rt. NC 41. June 1, 1950. Radford 5138. (U.NC-49260; U.Minn-536024); bank of Limestone Creek near Rt. NC 24, W of Beulahville. Sept. 13, 1949. Radford 5056. (U.NC-50276); Moore Co.: Banks of Little River, E of Thaggards Pond, April 22, 1950. Radford 5059. (U.NC-50467; U.Minn-536035); New Hanover Co.: From a stream near Wilmington. Dec. 18, 1939. Mrs. J.H.Cummings. (TEX-38940; U.NC-12972). (Spec. labelled I. engelmannii A.Br.); Pender Co.: Sluggish stream, 3 mi. E of Rt. NC 53 and Rt. US 421 Intersection. Apr. 23, 1949. Radford 4007. (U.NC-50319; Moores Creek near Rt. NC 53. Apr. 23, 1949. Radford 4012. (U.NC-50280 and 47761); Sampson Co.: Muddy bank of Six

Runs Creek near Rt. NC 24. Sept. 13, 1949. Radford 5059. (U.NC-50530); Union Co.: Oak-hickory woods, 0.7 mi. W of New Salem on Rt. NC 218. May 4, 1956. Radford 10599. (U.NC;REED).

South Carolina: Darlington Co.: Black Creek swamp about 100 yards from Old Lyde Bridge place. Oct. 18, 1941. B.E.Smith. (U.NC-23724); in edge of lake, Hartsville. Oct. 24, 1941. B.E.Smith. (U.NC-23719); growing entirely submerged in Prestwood Lake near Coker College boathouse, Hartsville. Feb. 13, 1939. Velma Matthews. (U.NC-8398); Prestwood Lake, Hartsville. Apr. 3, 1939. W.C.Hewitt. (U.NC-11153); York Co.: Stream, 1.5 mi. WNW of junction Rt. SC 82 and SC 72, Smiths. Apr. 14, 1957. Harry E. Ahles 22973 and John G. Haesloop. (U.NC).

Virginia: Augusta Co.: 1936. Lloyd G. Carr & E.T.Wherry. (TYPE); marsh, 3.5 mi. SW of Stuarts Draft. June 5-6, 1938. E.P.Killip 32544. (TYPE loc.). (US); Page Co.: In small drying muddy pool, elev. 3500 ft. Shenandoah Nat. Park, Big Meadows. July 21, 1945. N.C.Fassett 22309. (U.Wisc.;REED); Prince Edward Co.: Small drainage ditch in open woodland. May 13, 1938. A.B.Massey & Edith Stevens. (Pfeiffer, Bull. Torr. Bot. Club, 66: 413. 1939).

7. ISOETES PIEDMONTANA (Pfeiffer) Reed, comb. nov. Map 4B(dots).

Syn.: Isoëtes virginica var. piedmontana Pfeiffer, Bull. Torr. Bot. Club, 66: 411. 1939; Reed, Bol. Soc. Brot., 2a ser., 27: 56. 1953.

The anatomical and ecological characteristics of this species link it with the melanopoda-melanospora-butleri-lithophila-complex rather than to the engelmannii-virginica-flaccida-complex. It is confined to granitic situations, similar to I. melanospora, I. lithophila and some specimens of I. melanopoda. In the southeast this species seems to be the expression of I. melanopoda. I have been unable to identify any specimens from east of the Mississippi River as I. melanopoda, even though several collections have had this annotation.

Georgia: Barrow Co.: Shallow pools on flat granite rocks near Parks Mill, 1.5 mi. N of Auburn. Mar. 17, 1937. Pyron & McVaugh 1352. (UGa-13856; REED); shallow depressions in granite, Parks Mill, 2 mi. NW of Auburn. Apr. 3, 1938. Pyron & McVaugh 2414. (UGa-16389); shallow pools on flat granite rocks, just S of Winder. Mar. 17, 1937. Pyron & McVaugh 1339. (UGa-13855); muddy pools over flat granite rock, 1 mi. W of Winder. Mar. 17, 1937. Pyron & McVaugh 1341. (UGa-13817); Columbia Co.: Moist soil on flat granite rock, "Heggie Rock", emersed, 8 mi. E of Appling. May 23, 1937. Pyron & McVaugh 1676. (UGa-14335;REED); Douglas Co.: Moist soil on flat granite rock, emersed, 0.2 mi. W of Douglasville. May 30, 1937. Pyron & McVaugh

1728. (UGa-14286; Butler Univ.-35509; REED); Elbert Co.: Bog in flatwoods, 1.2 mi. N of Fortsonia, farm of Guy T. Bell, Piedmont Province. May 3, 1956. G.W.McDowell. (UGa-52355); mud on edge of flat granite exposure, 2.4 mi. SE of Elberton. May 6, 1954. G.W.McDowell. (UGa-50696); Greene Co.: Shallow pools of granite outcrop, "Flatrock", 9 mi. SE of Greensboro. May 16, 1937. Pyron & McVaugh 1645. (UGa-14196; REED); same loc., Feb. 1, 1939. Pyron 125. (UGa-17783); Gwinnett Co.: Submerged in shallow pool in granite outcrop, about 1 mi. W of Loganville. Mar. 24, 1949. H.E.Moore & G.H.M.Lawrence 600. (Univ. Coimbra; UGa-52354); SW of Grayson. May 3, 1928. E.T.Wherry. (US); Heard Co.: Shallow soil about granite outcrops, 4 mi. SW of Franklin. Apr. 30, 1938. Pyron & McVaugh 2835. (UGa-16376); same loc. and date. Pyron & McVaugh 2840. (UGa-16387); same loc., May 30, 1937. Pyron & McVaugh 1753. (UGa-14370); Hancock Co.: Shallow vernal pools about granite outcrops, 3 mi. SE of Sparta. Mar. 14, 1939. McVaugh 4663. (DUKE-68053); same loc., Feb. 13, 1938. Pyron & McVaugh 2061. (UGa-15774; REED); Newton Co.: In bogs with Xyris on edge of granite-gneiss outcrop, near Oxford. Mar. 21, 1937. Don Eyles 957. (UGa-156711); in sluggish streamlet, on granite outcrop, 4 mi. N of Covington. Mar. 14, 1939. F.J.Hermann 10166. (US); Oglethorpe Co.: Shallow soil about granite outcrops, Echols Mill, 12 mi. NE of Lexington. Apr. 4, 1938. Pyron & McVaugh 2422. (UGa-16386, 16375; REED); same loc., May 13, 1938. Pyron & McVaugh 2869. (TYPE,UGa-16384); Pike Co.: Shallow soil about granite outcrop, 4 mi. NW of Concord. Mar. 23, 1938. Pyron & McVaugh 2293. (UGa-16377); same loc., Oct. 24, 1937. Pyron & McVaugh 1931. (UGa-14625, basal face of megaspore with shallow rounded ridges, scarcely anastomosing); Putman Co.: Shallow soil about granite outcrops, 13 mi. E of Eatonton. Apr. 2, 1938. Pyron & McVaugh 2406. (UGa-16388); same loc., Feb. 20, 1938. Pyron & McVaugh 2073. (UGa-15763); Walton Co.: Shallow pools on flat granite rocks, 1 mi. E of Logansville. Apr. 19, 1936. Pyron & McVaugh 822. (UGa-11231); same loc., Mar. 15, 1936. Pyron & McVaugh 484. (UGa-11291); same loc., Dec. 8, 1935. Pyron & McVaugh 353. (U.Minn-356441; U.ND; US; Butler Univ.-58370; UGa-18206); same loc., Pyron & McVaugh 352. (UGa-18307); Warren Co.: Muddy places about granite outcrops, Cedar Rock Quarry, 5 mi. E of Camak. Feb. 13, 1938. Pyron & McVaugh 2050. (UGa-15805).

North Carolina: Franklin Co.: Granite barrens, 2.7 mi. W of Nash-Franklin Co. line, on Rt. NC 56. Apr. 25, 1957. H.E.Ahles & J. Haesloop 23834. (U.NC; REED); Cedar Rocks, between Louisburg and Castalia, in shallow sandy pool. May 30, 1946. H.J.Oosting 2301 and L.E.Anderson. (DUKE-115195; U.Minn-405867); Rowan Co.: In a shallow pool on granite, 0.4 mi. SW of Shupings Mill. Apr. 12, 1957. James H. Horton 826. (U.NC-102226); on granite, 4 mi. SE of Salisbury. Apr. 21, 1956. Radford 10240. (U.NC; REED); Salisbury. May 30, 1895. W.W. Ashe. (U.NC-10159); shallow stream on granite, Bringle Ferry Road, 0.3 mi. ESE of Dunns Mt. Road. Mar. 11, 1957. James H. Horton 645.

(DUKE-143014; U.NC-102227; REED); Wake Co.: Seepage slope on granite near Little River, 2 mi. NE of Rolesville. Apr. 21, 1955. Radford 8346. (U.NC-86811, leaves 10-12 cm., 25-30 leaves per plant); granite outcrop at Mitchells Mill, 2 mi. E of Rolesville near Little River. Apr. 23, 1957. Robt. F. Britt 482. (U.NC); same loc. and date. P.J.Crutchfield 543. (U.NC); same loc. Apr. 22, 1958. Patrick W. Carlton 218. (U.NC).

South Carolina: Spartanburg Co.: Wet soil over granite depressions, 3 mi. SE of Greer. May 11, 1939. Stanley A. Cain. (U.Tenn-936; REED; originally labelled I. butleri).

8. ISOETES RIPARIA Engelm. ex A.Br., Flora, 29: 178. 1846; Amer. Jour. Arts & Sci. II, 3: 53. 1847; Gray's Manual, ed. 5, 676. 1867; Baker, Jour. Bot. 18: 69. 1880; Pfeiffer, Ann. Mo. Bot. Gard., 9: 181. 1922; Broun, Index N. Amer. Ferns, 103. 1939 (partim); Proctor, Amer. Fern Jour. 39(3): 86-87. 1949; l.c., 39(4): 110-121. 1949; Reed, Bol. Soc. Brot., 2a ser., 27: 45-46. 1953. Map 5.

Syn.: Calamaria riparia (Engelm.) Kuntze, Rev. Gen. Pl., 2: 828. 1891-93; Isoëtes foveolata var. plenospora Eaton, Rhodora 5: 280. 1903 (partim).

8A. ISOETES RIPARIA Engelm. ex A.Br., var. RIPARIA; Proctor, Amer. Fern Jour. 39: 119-121. 1949; Reed, Bol. Soc. Brot., 2a ser., 27: 46. 1953. Map 5A(dots).

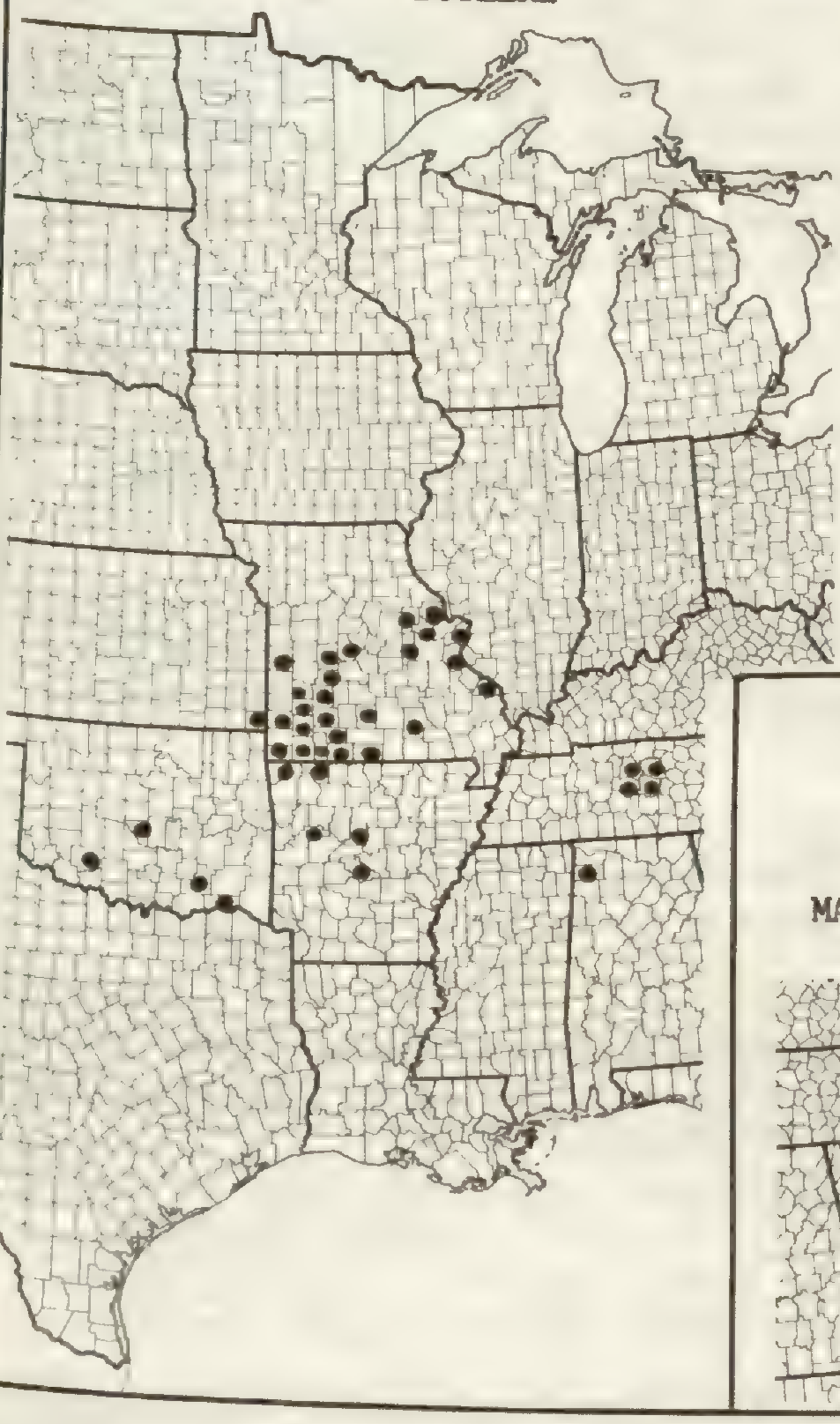
Syn.: Isoëtes riparia var. typica Proctor, Amer. Fern Jour. 39: 119-121. 1949.

Pennsylvania: Philadelphia. 1866. Ex Herb. Engelmann. (DUKE-61812; Delaware River off Chester. Aug. 1894. A.B.Seymour. (DUKE-61812; Aug. 1, 1895. T.C.Palmer. (U.Conn); Aug. 1, 1896. T.C.Palmer. (U.Minn-55754); Perry Co.: In Newport Reservoir, 3 mi. NE of Newport. May 26, 1964. Reed 67057; Juniata Co.: In reservoir on East Licking Creek, Clearview, 6 mi. SW of Miffin. May 26, 1964. Reed 66982; Lycoming Co.: Edge of water, emersed in water, 2 mi. S of Muncy, Susquehanna River, east bank. July 23, 1951. W.E.Manning. (Bucknell U.; REED).

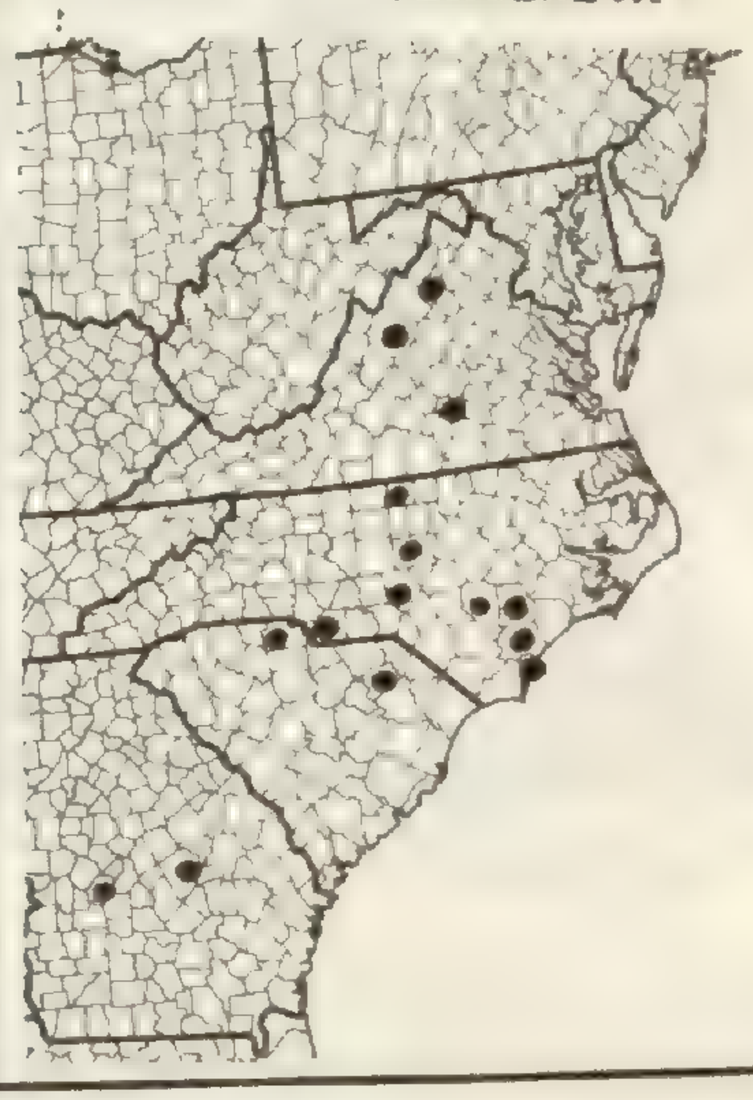
Delaware: New Castle Co.: River Thone, Hollyoak. June 22, 1896. E.Tatnall. (U.Conn, macrospores approach I. macrospora); shore of Delaware River. 1865. Wm. M. Canby. (GH;US); Claymont, river shore. June 22, 1896. A.Commons. (GH;ANSP); gravelly shore of Delaware River between high tides, near Wilmington. July 11, 1866. A. Commons. (US).

Maryland: Baltimore City: Edge of pond atMontebello Reservoir, plentiful here. Sept. 1958. Reed 41499 (polygamous); in

MAP 3B. ISOETES
BUTLERI



MAP 4A. ISOETES
VIRGINICA



MAP 4B. ISOETES
PIEDMONTANA

2 ft. of water, edge of Montebello Filtration Reservoir. July 18, 1961. Reed 51265; Baltimore Co.: Crook Road at Bird River Beach, along Bird River, tidal shore. July 22, 1961. Reed 51412; along tidal shore near mouth of Gunpowder River near Bird River. July 22, 1961. Reed 51413 and 51414; Cecil Co.: Between tide levels, gravelly and stoney, east shore of Susquehanna River, near its mouth at Frenchtown. Sept. 7, 1948. Geo. R. Proctor 3606. (US); along Sassafras River near Georgetown. Aug. 23, 1952. Reed 30275; Harford Co.: Water 1-2 ft. deep, along edge of Susquehanna River, at head of Chesapeake Bay, SE of Havre de Grace. June 1, 1951. Reed 24897 and 24898; same loc. Aug. 16, 1951. Reed 26790; same loc. Dec. 1, 1961. Reed 28030; in water 1 ft. deep, S of Havre de Grace, Chesapeake Bay. Sept. 20, 1953. Reed 32925; tidal shore along Chesapeake Bay, S of Havre de Grace. July 21, 1961. Reed 51403 and 51405.

North Carolina: Pitt Co.: Stream bank, 2.7 mi. NNE of Grimesville. Aug. 10, 1958. Radford 39702. (U.NC).

South Carolina: Dillon Co.: Bear Swamp, 0.3 mi. S of junction of Rt. 22 and Rt. SC 9, on Rt. 22, E of Dillon. July 25, 1957. H.E.Ahles & R.S.Leisner 32295. (U.NC; REED). Checks out very close to var. riparia.

Virginia: New Kent Co.: Fresh tidal shore of Chickahominy River, Lanexa, Virg. May 1938. Fernald & Long 13508. (UWVa, 2 sheets, androspores only, smooth; looks like var. palmeri).

8B. ISOETES RIPARIA VAR. RETICULATA (Eaton) Proctor, Amer. Fern Jour. 39: 119. 1949; Reed, Bol. Soc. Brot., 2a ser., 27: 46. 1953. Map 5A(plus)

Syn.: Isoëtes saccharata var. reticulata Eaton in Steele, Proc. Biol. Soc. Wash., 14: 49. 1901; Isoëtes saccharata forma reticulata (Eaton) Eaton, Fern Bull. 11: 25. 1903; Clute, Fern Allies,p. 260. 1905; Fern Bull. 16: 57. 1908.

District of Columbia: Tidal beach opposite Navy Yard, Anacostia River, Washington. Sept. 1, 1900. E.S.Steele. (GH; U.Minn-55757 and 55753).

Virginia: Four Mile Run near Alexandria, abundant between tidal limits. July 12, 1905. I. Tidestrom. (GH, labelled I. saccharata); Fairfax Co.: Tidal shore of Potomac River, in very fine sand or clay rather than mud, New Alexandria. Oct. 20, 1929. S.F.Blake 11088. (U.Conn; REED); mouth of Dogue Creek, below Mt. Vernon. July 2, 1933. F.M.Uhler & A.L.Nelson. (Fish & Wildlife

Research, Patuxent); between tides along the Potomac River at the north end of Alexandria. Sept. 5, 1938. Neil Hotchkiss 6038. (Fish & Wildlife Research, Patuxent); near Washington. May 15, 1906. H.H.York. (TEX-38936).

8C. ISOETES RIPARIA var. PALMERI (Eaton) Proctor, Amer. Fern Jour. 39: 119. 1949; Reed, Bol. Soc. Brot., 2a ser., 27: 45. 1953; Massey, Bull. 256, Virginia Polytechnic Institute, Agr. Ext. Serv., p. 67. 1960. Map 5B(dots.).

Syn.: Isoëtes saccharata var. palmeri Eaton in Steele, Proc. Biol. Soc. Wash. 14: 49. 1901; Isoëtes saccharata forma palmeri (Eaton) Eaton, Fern Bull. 11: 25. 1903; Clute, Fern Allies, 260. 1905; Fern Bull. 16: 57. 1908; Isoëtes riparia var. palmeri forma saccharata (Engelm.) Proctor, Amer. Fern Jour. 39: 119. 1949; Reed, Bol. Soc. Brot., 2a ser., 27: 45. 1953; Isoëtes saccharata Engelm. in Gray's Manual, ed. 5, 676. 1867; Baker, Jour. Bot. 18: 69. 1880; Motel. & Vendr., Actes Soc. Linn. Bord., 36: 356. 1883; Engelm., Trans St. Louis Acad. Sci. 4: 382. 1882; Pfeiffer, Ann. Mo. Bot. Gard., 9: 179. 1922; Calamaria saccharata (Engelm.) Kuntze, Rev. Gen. Pl., 2: 828. 1891-93; Isoëtes riparia forma saccharata (Engelm.) Clute, Fern Bull. 16: 57. 1908 (nom. prov.).

Pennsylvania: Bucks Co.: Delaware River. July 1886. Misses Ruth, ex Herb. G.B.Aiton. (U.Minn-55773).

Delaware: Sussex Co.: Shore of Nanticoke River. Aug. 1874. Wm. Canby. (GH; US); 1 mi. E of Blades, in mud on south shore of Nanticoke River. Sept. 5, 1936. R.R.Tatnall 3170. (GH).

Maryland: Baltimore Co.: Along shore under water, Bird River near Whitemarsh. Aug. 22, 1951. Reed 27045; Caroline Co.: Shore, ebbtide of Choptank River, 1.5 mi. N of Williston. Sept. 25, 1938. Mary J. Fisher 52. (U.Pa; UWVa); tidal bank of Choptank River, 2 mi. S of Denton. Sept. 25, 1938. E.T.Wherry. (GH); gravelly tidal shore, east side of Choptank River, above RR bridge at Denton. Sept. 6, 1947. Geo. R. Proctor 3097. (US); Cecil Co.: Coves of Elk River. Aug. 1894. A.B.Seymour. (DUKE-61811); Piney Creek Cove, Elk River. Aug. 1894. T.C.Palmer. (GH); Back Creek on Elk River. Aug. 1893. T.C.Palmer. (GH); many of the specimens from the Head of Chesapeake Bay, around Susquehanna Flats, are difficult to place exactly since the megaspores vary tremendously, as well as the plant size, the sporangia size (in some specimens there are up to 60 leaves and the sporangia are 1 cm.long and nearly 1 cm. wide); some look like very short specimens of I. engelmannii while others resemble very long I. riparia;

along Sassafras River near Georgetown. Aug. 23, 1952. Reed 30275 (Some specimens look like f. saccharata); Town Point, Elk River. July 31, 1896. T.C.Palmer. (US); Cabin Johns Creek, Elk River. July 21, 1896. T.C.Palmer. (US); sandy shore of Northeast River, Carpenters Point, Charlestown. Sept. 17, 1926. S.F.Blake 9693. (US); among pebbles along shore of Northeast River, Lewis Shore. May 25, 1963. Reed 62099; mouth of Northeast River at Charlestown, Susquehanna Flats. July 8, 1963. Reed 64340 and 64341; Harford Co.: Bush River. June 18, 1938. E.L.Core 6737. (UWVa); on tidal mud, Gunpowder River. May 21, 1905. "S. & M." in Herb. Forrest Shreve. (U.Minn-521991); 0.5 mi. S of Havre de Grace. July 19, 1902. Geo. H. Shull 66. (GH; US); North shore of Little Gunpowder River, 13 mi. from its mouth. Sept. 3, 1902. Geo. H. Shull 305. (GH; US); along Chesapeake Bay, tidal shore, S of Havre de Grace. July 21, 1961. Reed 51404; same loc., Sept. 20, 1953. Reed 32919, 32920, 32921; Kent Co.: Lloyds Creek. Aug. 12, 1895. T.C. Palmer. (GH; U.Conn, note by Eaton, "Type of var. palmeri A.A.Eaton, probably only one of the many forms of the species"); Lloyds Creek, Sassafras River. July 26, 1896. T.C.Palmer. (U.Minn-55756); July 30, 1896. T.C.Palmer. (US); shallow water, Still Pond Creek. July 20, 1947. A.Owens. (U.Md.); Wicomico Co.: Shore of Wicomico River, 1 mi. S of Salisbury. Sept. 8, 1866. Wm. M. Canby. (GH; TYPE LOC.); on river shores near Salisbury. A.V.Smith. (Rhodora 41: 111. 1939); south shore of Longtank, ¼ mi. from Wicomico River, 2.5 mi. SW of Salisbury. Aug. 14, 1940. J.B.S.Norton. (U.Md.); Sharptown on the Nanticoke River. A.V.Smith. (Rhodora 41: 111. 1939); in gravel overlaid with mud, slightly brackish tidal shore of Nanticoke River, ¼ mi. NE of Sharpstown. Sept. 6, 1947. Geo. R. Proctor 3092. (US). Maryland Eastern Shore without exact county record: Notley Hall, Maryland. 1894. F.V.Coville 32. (US; GH; cited by Pfeiffer, p. 180; Calif. Acad. Sci.°93671).

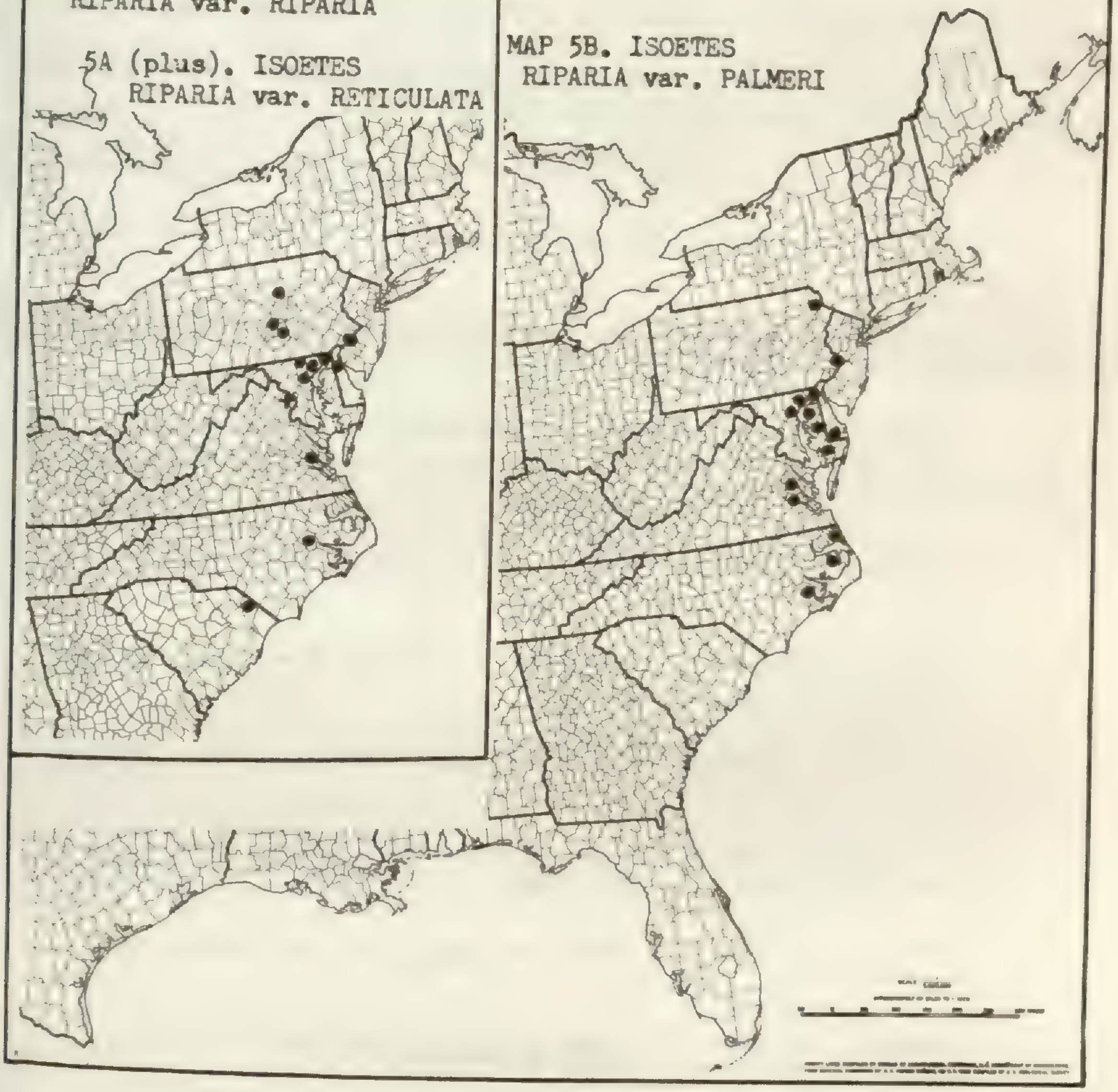
Virginia: New Kent Co.: Fresh tidal shore of Chickahominy River, Lanexa. Sept. 13, 1941. Fernald & Long 13508. (UGa-2858; US); King William Co.: Fresh tidal shore of Mattaponi River at Horse Landing near King William C.H. Oct. 14-16, 1939. Fernald & Long 11508. (US).

North Carolina: Craven Co.: Marsh near junction of Brice Creek and Trent River. June 28, 1951. Radford 5895. (U.NC); brackish marsh, near Trent River, S of New Bern. July 17, 1958. Radford 37337. (U.NC); Currituck Co.: North River, W of Powells Point. June 4, 1951. Radford 5766. (U.NC); Tyrrell Co.: Alligator River, near Ft. Landing. July 22, 1949. Radford 4624. (U.NC-50532, male); July 4, 1950. Radford 5408. (U.NC-50239, female).

MAP 5A (dots). ISOETES
RIPARIA var. RIPARIA

5A (plus). ISOETES
RIPARIA var. RETICULATA

MAP 5B. ISOETES
RIPARIA var. PALMERI



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Vol. 12 December, 1965 No. 7

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# ITINERARY OF EDOUARD FRANÇOIS ANDRÉ

# IN HIS EXPEDITION TO THE NORTHERN ANDES 1875-76

Lyman B. Smith

---

The present account was inspired by the work of T. A. Sprague and N. Y. Sandwith on the itineraries of Humboldt and Bonpland and it is hoped that it will find the same use. It has laid in my files awaiting final polish more years than I like to think, so I am bringing it out now before somebody else has to salvage it for me.

Edouard François André was commissioned by the French government to make a general scientific survey in the region of the northern Andes and although the main emphasis was on botany, other fields were not neglected. Since André was not reimbursed for the expenses of the expedition, he was forced to recoup by selling his specimens to the Royal Botanic Gardens, Kew, where they may now be consulted. He was a horticulturist as well as a scientist and his collections are particularly rich in ornamentals such as orchids, bromeliads, aroids, begonias, and palms.

This itinerary has been prepared by searching out André's collections in the Gray Herbarium of Harvard University, where there is a good set, and by noting every locality mentioned in his serial account in "Le Tour du Monde".

## ITINERARY

FRANCE.

November 7, 1875. André sailed from Saint-Nazaire (1).

GUADELOUPE, W. I. (2).

November 22, 1875. Landed at Pointe-à-Pitre (3).

MARTINIQUE, W. I. (4).

November 22-23, 1875. Saint-Pierre (5); Morne-Rouge (6); Fort-de-France (7).

VENEZUELA.

November 24-27, 1875. La Guayra (8) and the small river of Maiquetia (9); Puerto Cabello (10, the date inferred from the text would be November 25, but a specimen of Tillandsia recurvata from here is labelled November 27).

COLOMBIA, Atlántico (11) or Magdalena (12).

About November 28 or 30, 1875. Savanilla (13); Salgar (14); Barranquilla (15); Soledad (16); Sitionuevo (17); Remolino (18).

COLOMBIA, Bolívar (19) or Magdalena (20).

Early December, 1875. Calamar (21); Barrancanueva (22); Nerviti (23); San Agustin (24); Tenerife (25, collections cited from here!); Sambrano (26); Tetón (27); Tacamocho (28); forks of the Rio Magdalena (29); Brazo de Loba (30); Magangue (31); Blanco (32, exact location unknown).

COLOMBIA, Bolívar (33) or Santander (34).

Early December, 1875. Santander (35); Luru (36); Paturia (37)

Canalétas (38); San Pablo (39); Sogamozo (40).
COLOMBIA, Antioquia (41) or Santander (42).
Early December, 1875. Barranca Bermeja (43); Naré (44); Islitas (45, exact location uncertain).
COLOMBIA, Caldas (46) or Cundinamarca (47).
Early December, 1875. Guarumo (48); Conéjo (49); Caracoli (50); Rio Guali (51); Quebrada Seca (52).
COLOMBIA, Tolima (53).
December 13-14, 1875. Honda (54).
COLOMBIA, Cundinamarca (55), Honda to Bogotá
December 14-18, 1875. Bodéguitas or Pescadérias (56); Rio Séco (57); Las Cruces (58); Alto del Sargento (59); Guaduas (60); Alto del Raizal (61); Alto del Trigo (62); Hacienda de Palmar (63 a Hartweg locality); Cuné or Cuni (64); Alto de Petaquero (65), Villeta (66); Río Negro (67); bridge of Guama (68); Guayabal (69); Chimbe, Escobal or Agualarga (70); Asserradero (71); Facatativá (72); Serrezuela (73); Fontibon (74); bridge of San Antonio (75); Bogotá (76, December 18-29, 1875).
COLOMBIA, Bogotá (76) to Villavicensio (Meta).
December 29, 1875-January 2, 1876. Bogotá (76); Río Fucha (77); Tunjuélo (78); Barranquillas (79); Boquerón de Chipaque (80); Páramo de Chipaque (81); Río Cáqueza (82); Cáqueza (83); confluence of Río Negro (84) and Río Cáqueza; Puente de Quetame (85); Quetame (86); Quebrada Grande (87); Quebrada Jolu (88); Quebrada Naranjal (89); Quebrada Marcelita (90); Quebrada Blanca (91); Quebrada Perdices (92); Quebrada Tasajera (93); Quebrada de Susumuco (94); San Miguel (95); Quebrada de Chirajara (96); Meseta de Susumuco (97); Susumuco(98).
META:(99): Pipiral (100); Servita (101); Alto de Buenavista (102); Villavicensio (103).
COLOMBIA, Meta: Villavicensio to Upín and return.
January 3-9, 1876. Río Parado (104); Quebrada del Gramalote (105); Río Guatiquia (106); Vanguardia (107); Río Salitre (108); Hacienda Salitre (109); Río Upín (110); Río Canei (111); Cumaral (112); Upín (113).
COLOMBIA, Meta: vicinity of Villavicensio.
January, 1876. El Buque (114); Ocoa (115); Savanna of Apiai (116); Hacienda Boca del Monte (117); Hacienda Compañia (118); Hacienda Vigía (119); Hacienda Esperanza (120); Caño de Quenane (121); Caño de Pachaquiaro (122).
COLOMBIA, return to Bogotá from Villavicensio.
January, 1876. Numbers 76 to 103 inclusive in reverse.
COLOMBIA, vicinity of Bogotá.
January to February 2, 1876. Guadalupe (123); "Boquerón" (124, locality of Linden, Karsten, Triana, and Lindig); Chapinero (125); "Quinta de Bolívar" (126).
COLOMBIA, Cundinamarca: Bogotá to Fusagasugá.
February 2-7, 1876. Bogotá; Soacha (127); Río Funza or Río Bogotá (128); Canoas farm (129); Hacienda Tequendama (130); Salto de Tequendama (131); Cerro de Pasquilla (132, a detached branch of the Páramo de Chipaque); Sibate farm (133); Puerta Grande (134); Páramo de San Fortunato (135, locality of Hartweg, Linden,

Goudot, Lindig, and Triana); Barro Blanco (136); Aguadita cabin (137); Fusagasugá (138, February 4-7, 1876).

COLOMBIA, Cundinamarca: side trip from Fusagasugá to Icononzo.

February 7-10, 1876. Río Cuja (139); Río Sumapaz (140); village of Arbelaez (141); Quebrada de la Honda (142); Pandi, also called Tumbia or Mercadillo (143); bridge and gulf of Icononzo (144); grotto of Alfonsa or Alfonza (145); return to Fusagasugá.

COLOMBIA, Cundinamarca: side trip from Fusagasugá to Páramo

February, 1876. Pasca (146); Río Cuja (147); Páramo (148); return to Fusagasugá.

COLOMBIA, Cundinamarca: Fusagasugá to Guataqui.

February, 1876. Río Subia (149); bridge of Chocho (150); bridge of Chinaota (151); cuevas or grottos of Panche (152); Río Panche (153); Panche (154).

Side trip from Panche to Cuevas: Cerro de Peña Blanca (155); Cerro d'Anvila or d'Avila (156); Alto de Viotá (157); valley of Melgar (158); valley of Limones (159); mountain of Cuevas (160, by Cerro d'Anvila); Picacho de la Guacamaya (161, a peak of the Cerro d'Anvila near Panche); La Cruz de Mayo (162); return to Panche.

Continuation of westward travel from Panche: Tibacui (163); Cerro de Viotá (164); Alto de Viotá (165); Viotá (166); Río Viotá (167); Río Cachimbulo (168); Río Bogotá (169); Tocaima, bridge and village (170); Alto de Limba (171); Parado (172); Casas Viejas (173); Río Séco (174); Guataqui (175).

COLOMBIA, Tolima: Río Magdalena to Boquerón de Quindio.

March 1-9, 1876. Río Magdalena (176); Guataquicito (177); Piedras (178); Río Opia (179); San Miguel (180); Cuatro Esquinas (181); Cerca de Piedras cabin (182); Río Chipalo (183); IBAGUÉ (184); Río Combeima (185); Palmilla (186); El Moral (187); Mediacion (188); Río Coello (189); Quebrada de Buenavista (190); Quebrada de Aguacaliente (191); Quebrada de l'Azufral (192); Alto de San Juan (193); Pie de San Juan (194); Río San Juan (195); Toche (196); Las Cruces (197); Gallego (198); La Ceja (199); Ceja del Monte (200); Volcancitos (201); Boquerón de Quindio, divide (202)

COLOMBIA, Caldas: Quindio divide to Río de la Vieja.

March 9-15, 1876. Quindio divide (202); Barsinal (203); Salento or Boquia (204); Río del Quindio (205); Río Boquia (206); El Roble (207); Portachuelo (208); Novilleros (209); San José (210); Buenavista (211); Las Pavas (212); Cañas (213); Cuchilla de Mejilla (214); Balsa (215); Tambores (216); Piedra de Moler (217); Río de la Vieja (218).

COLOMBIA, El Valle del Cauca: Cartago to Buga.

March 15-29, 1876. CARTAGO (219, March 15-25, 1876); Venta Quemada (220); Quebrada de Saragoza or Zaragoza (221); Quebrada de las Piedras (222); Quebrada de Peladillo (223); Pedro Sanchez (224); Quebrada de la Mena (225); Naranjo (226); Quebrada del Pedernal (227); Quebrada de los Micos (228); Victoria (229); Quebrada la Honda (230); Quebrada de las Lajas (231); SARZAL or ZARZAL (232); Limones (233); Quebrada de las Cañas (234); Río de la Paila (235); Paila (236); Quebrada de Guavito (237); Quebrada de

Murillo (238); Quebrada Overo (239); Buga-la-grande (240); Río Buga-la-grande (241); San Vicente (242); Quebrada Folleco (243); Río Morales (244); Río Tuluá (245); TULUÁ (246); Río Zanjon del Sastre (247); Presidente (248); Quebrada Chambimbal (249); Quebrada Honda (250); Río Buga or Río de las Piedras (251); BUGA (252).

COLOMBIA, El Valle del Cauca: Buga to Cali and the Río Cauca by way of the Dagua Valley.

March 29-April 12, 1876. Buga; Río Cauca (253); Río Mediacanoa (254); Yotoco (255); Quebrada Yotoco (256); Quebrada Negrito (257); Hacienda Hatoviejo (258); Quebrada Espinal (259); Hacienda Espinal (260); Hacienda Guaval or Portachuelo (261); Quebrada Guaval (262); Hacienda del Trapiche (263); Vijes (264); Quebrada Potrerito (265); Alto del Potrerito (266); Quebrada de San Marcos (267); Hacienda de San José (268); Hacienda d'Ocachi (269); LAS PAVAS (270); Río Bitaco (271); Alto de Bitaco (272); Hacienda Simarronas (273).

Westward side trip down the Dagua Valley: Río Dagua (274); Hacienda del Dagua (275); Quebrada del Naranjo (276); Quebrada de Jiménez (277); Las Juntas (278); Río Pepita (279); return to Hacienda del Dagua and the nearby crossing of the Río Dagua.

Resumption of travel toward Cali: La Vijia (280); Hornos (281) Salado Valley (282); Papagayero (283); La Laguna (284); Hacienda Platanales (285); Tocotá (286); last crossing of the Río Dagua (287); Farallones de Cali (288); Campo Alegre (289); Alto de San Antonio (290); Río Cali (291); CALI (292, April 2-11, 1876).

Vicinity of Cali: chapel of San Nicolas (293); Quebrada del Cabuyal (294); Agua Blanca (295).

Resumption of southward travel: CALI; Quebrada Cañaveralejo (296); Los Cristales (297); Hacienda de San Fernando (298); Río Melendez (299); Río Canasgordas (300); Cañasgordas (301); Río de la Vega (302); Río Jamundi (303); Jamundi (304); Hacienda del General Trujillo (305); Hacienda de Corinto (306); Río Claro (307); Cañitas (308); crossing of the Río Cauca (309) at Paso de la Balsa (310).

COLOMBIA, Cauca: Buenosaires to Popayan.

April 12-15, 1876. Buenosaires (311); Tetá (312); Río Ovejas (313); Aganche (314); Santa Marta (315); Almorzadero (316); Morales (317); El Hatico (318); Alto de Piendamo (319); Piendamo (320); Río Piendamo (321); Río Cajibio (322); Río Cofre (323); Jinena (324); Río Cauca (325); Río del Molino (326); POPAYAN (327).

COLOMBIA, Cauca: vicinity of Popayan.

April 15-19. Coconuco (328); pueblo of Puracé (329); volcano of Puracé (330); Río del Molino (331); Río Arambio (332); Chorrera de San Antonio or falls of the Río Pasambio or Vinagre (333); Las Monjas cascade (334).

COLOMBIA, Cauca: Popayan to Río Mayo.

April 19-26, 1876. POPAYAN: Río dos Brazos (335); Río Roble (336); Cuchilla del Tambo, the divide between Atlantic and Pacific drainage (337); Río Timbío (338); TIMBÍO (339); Casa Alegria (340); Alto de Cuevitas (341); Río de las Piedras (342); Río

Quilcase (343); Alto de la Horqueta (344); DOLORES or La Horqueta (345); Río Esmita (346); Río and Quebrada Santo Thomas (347); Los Arboles rancho (348); La Puertica (349); Santa Lucía (350); Alto de San Francisco (351); San Francisco (352); Quebrada de Guavita (353); Río Guachicono (354); Aguas Blancas (355); Guardapariba (356); El Bordo (357); Quebrada Bobo (358); PATÍA (359); Herradura (360); Tamarindo (361); peninsula of Los Dos Rios (362) between the junction of Río Guachicono (363) and Río San Jorje (364); San Marcos (365); Mojarras (366); Mesa de Mercaderes (367); Alto de Dorotes (368); Mercaderes (369); Puerta de Sombrerillos (370); Río Mayo (371).

COLOMBIA, Nariño: Río Mayo to Pasto.

April 26–29, 1876. Río Mayo (371); Caldera (372); La Horqueta (373); La Union (374); Berruecos (375); Olaya (376); Quebrada Mazamorra (377); La Cañada (378); Río Juanambú (379); Río Besaquillo (380); Ortega (381); Quebrada Meneses (382); Meneses hacienda (383); Buesaco (384); Alto de Aranda (385); PASTO (386, April 29–May 15, 1876).

COLOMBIA, Nariño, side trip from Pasto to Volcán de la Galera.

May, 1876. Pasto; Anganoi (387); Grottes del Peligro (388); Volcán de la Galera or Volcán de Pasto (389); return to Pasto.

COLOMBIA, Nariño: side trip from Pasto to lake of La Cocha.

May, 1876. Pasto; La Laguna (390); Cordillera and Alto del Tabano (391); Quebrada Yacuco (392); el perro curuncho or the cañon trail (393); Las Crucitas (394); Alto de la Cruz (395); Rancho de Casapamba (396); Laguna Cocha or Cocha de Corotá (397); return to Pasto.

COLOMBIA, Nariño: Pasto to Túquerres.

May 15–16, 1876. PASTO; Yacuanquer (398); Tacuaya hacienda (399); Río Guáitara (400); Santa Rosa hacienda (401); TÚQUERRES (402, May 16–20, 1876).

COLOMBIA, Nariño: vicinity of Túquerres.

May 16–20, 1876. Volcán de Túquerres or Volcán de L'Azufral (403), containing Laguna Verde (404) and Cerro Redondo (405).

COLOMBIA, Nariño; Túquerres to Barbacoas and return.

May 20–30, 1876. TÚQUERRES; Espino (406); Volcán de Cumbal (407); Alche (408); Chocorral (409); Arrayan (410); Guavo (411); Timbaquira (412); Yupe (413); Cuataquer (414); Cuchilla del Guavo (415); Río Guavo (416); MALLAMA (417); El Borracho (418); Piedra Ancha (419); Quebrada Pususquer (420); Pususquer (421); bridge of Guavo (422); San Miguel (423); Río Chucunés (424); Chucunés (425); Quebrada de Pilispi (426); SAN PABLO (427); Quebrada Agonia (428); Quebrada San Pablo (429); El Guadual (430); La subida de la Agonia (431); Río Cuaiquer (432); Quebrada Palpis (433); Quebrada Armada (434); Armada (435); Alto de Armada (436); Quebrada Carizal (437); El Carizal (438); Guascas (439); Cuaspi (440); Quebrada de Cuesbi (441); Alto de Ensillada (442); Quebrada Altaquer (443); Altaquer (444); Río Nembi (445); Quebrada de Tulpas (446); Quebrada de Cuyambé (447); Los Astrojos (448); Alto de los Astrojos (449); Cruz de los Bicundos (450); Quebrada Tejada (451); El Páramo (452); Quebrada Pipulta (453); Pilcuan (454);

Yeva (455); Buenavista or Bellavista (456); Descanso (457); Quendan (458); Almorzadero (459); Tejutes (460); BARBACOAS (461); return to Túquerres.

COLOMBIA, Nariño: Túquerres to Río Carchi.

May 30-June 1, 1876. Túquerres; Hacienda de Chillanquer (462); Guachucal (463); Río Sapuyes (464); Sapuyes (465); crossing the Río San Juan (466) by the Puente Ruidoso (467); Pupiales (468); Ipiales (469); La Laja (470); Río Males (471); Salto del Excomulgado (472); Iles (473); Cruz de Ecuasan (474); Hacienda de Cuarchu (475); bridge of Rumichaca (476) over the Río Carchi (477).

ECUADOR, Carchi: Río Carchi to Pusir.

Early June, 1876. Río Carchi; Río Bobo (478); Río Chapues (479); Río Tejes (480); TULCAN (481); Páramo de las Cuasas (482); Páramo de Boliche (483); Orejuela (484); HUACA (485); Tuza (486); Capuli (487); Cuesca (488); El Puntal (489); Savana de San Vicente (490); La Posta (491); Yascon (492); El Pelado (493); Pusir (494).

ECUADOR, Imbabura: Río Chota to Río Tupigache.

Early June, 1876. Río Chota (495); Yaguar-Cocha (496); Río de Taguando (497); IBARRA (498).

Vicinity of Ibarra: Salinas (499); Chorlavi (500); Chachimbiro (501); Hatuntaqui (502); Pimanpiro (503).

Resumption of southward travel: IBARRA; Río de Ajavi (504); San Antonio (505); Ileman (506); Río Mojanda (507); San Sebastian brook (508); Otavalo (509); Batan brook (510); San Roque (511); Lake of San Pablo (512); San Pablo (513); Hacienda de la Compañia (514); Hacienda Tupigache (515); Río Tupigache (516).

ECUADOR, Pichincha: Tabacundo to Quito.

Early June, 1876. Tabacundo (517); Cachihuango (518); Río Pisque (519); El Cascajal (520); Quebrada Chorrera (521); the equator (522); Guaillabamba (523); crossing the Río Guaillabamba (524) at Alchipilchi (525); QUITO (526).

ECUADOR, Pichincha: vicinity of QUITO.

June, 1876. Jerusalem (527); Manosalbas (528); Itsimbia (529) Río Machángara (530); Pichincha Volcano or Rucu-Pichincha (531); "El Panecillo" hill (532).

ECUADOR, Pichincha: QUITO to El Mirador and return.

June, 1876. Leaves Quito with R. P. Sodiro; Río Machángara (533); Hacienda de Arcadia (534); Tambillo (535) at the northern end of the Michachi Valley (536); slopes of El Corazón (537); Aloag (538); Hacienda Manrique (539); Concepción (540); Pucal (541); Paguangalli (542); Pungu (543); Río Silante (544); Miligalli (545); Canzacoto bridge (546); Río San Lorenzo (547); later becoming the Río Pilatón (548); Río Yamboya (549); Acapula cascade (550); San Florencio (551); Río Tandapi (552); El Cascajal (553); Río or Quebrada Calulu (554); Ganasa (555); San Nicolas rancho (556); Río or Quebrada San Nicolas (557); Río Napa (558); Río Toachi (559) replacing the name Río Pilatón (560) for the main river followed; Toachi (561); Río Ayariquia (562); Río Alluliqui (563); Río Lelia (564); Río Taguasa (565); Río Tante (566); Río Pasotante (567); Río Guanasilla (568); Guanasilla (569); El

Mirador (570); return to Quito by the same route.

ECUADOR, Pichincha: QUITO to Niebli and return.

June, 1876. Quito; Chapel of Belén (571); Egido de Iñaquito (572); Chupicruz (573); Hacienda Mendeville (574); Guapulo (575) in the valley of Machángara (576); Cotocollao (577); Pomasqui (578); Río Pomasqui (579); San Antonio de Pomasqui (580); Quinta Tanlagua (581); Quinta Conrogal (582); Alto de San Antonio (583); Quebrada de San Antonio (584); slopes of peak above Calacali (585); Pululagua (586); Niebli (587) with the nearby localities of the valley of Nanegal (588), the valley of Mindo (589), and Palta-Pamba (590); return to Quito.

ECUADOR, Pichincha: resumption of southward travel, QUITO to Machachi.

Early July, 1876. Quito; Tambillo (591); plain of Machachi (592).

ECUADOR, León: Páramo de Tiopullo to Río Patate.

July, 1876. Páramo de Tiopullo (593); Tiopullo (594); Panecillo or Pachusala (595); Ilinisa or Ilinisa Volcano (596); Pacahuaico (597); slopes of Cotopaxi Volcano (598); Mulalo (599); Río Callo or Alaques (600); TACUNGA, La Tacunga or Llactacunga (601); San Miguel (602); "Capilla de los Pasajeros" (603); Río Galpon (604); Río Patate (605).

ECUADOR, Tungurahua: Río Ambato to Mocha.

July, 1876. Río Ambato (606); San José de Atoche (607); AMBATO (608); Santa Rosa (609); Río Guachi (610); Mocha (611).

ECUADOR, Chimborazo: slopes of Chimborazo to Totorillas.

July, 1876. Slopes of Chimborazo (612); Chuquipoyo (613); Quebrada de Totorillas (614); Totorillas (615).

ECUADOR, Bolívar: Quinacorral to Las Playas.

July, 1876. Quinacorral (616); Guanojo or Guanujo (617); GUARANDA or Guabanda (618); Río Chimbo or Salinas (619); Santa Fé (620); San José (621); Ansacoto or Asancoto (622); SAN MIGUEL (623); Juantuloma (624); Río Cristal (625); Río Pisagua (626); Balsapamba or Balsabamba (627); Las Playas (628).

ECUADOR, Los Rios: Sabanetas to Babahoyo.

July 11, 1876. Sabanetas (629); Río de la Mona (630); Río Galvez (631); "La Laguna" (632); Babahoyo (633).

*André's published record in "Le Tour du Monde" ends here.

ECUADOR, Loja (?).

Puya eryngioides André, according to the label, was collected between Riobamba (634) and Loja (635) in August.

PANAMA.

André was in Panama (636) in August, 1876, on his way back to France.

Evidently André revisited Colombia and Ecuador about 1880, but no detailed account of this second trip has yet been found.

**André's French accentuation of place names has been returned to Spanish in this account.

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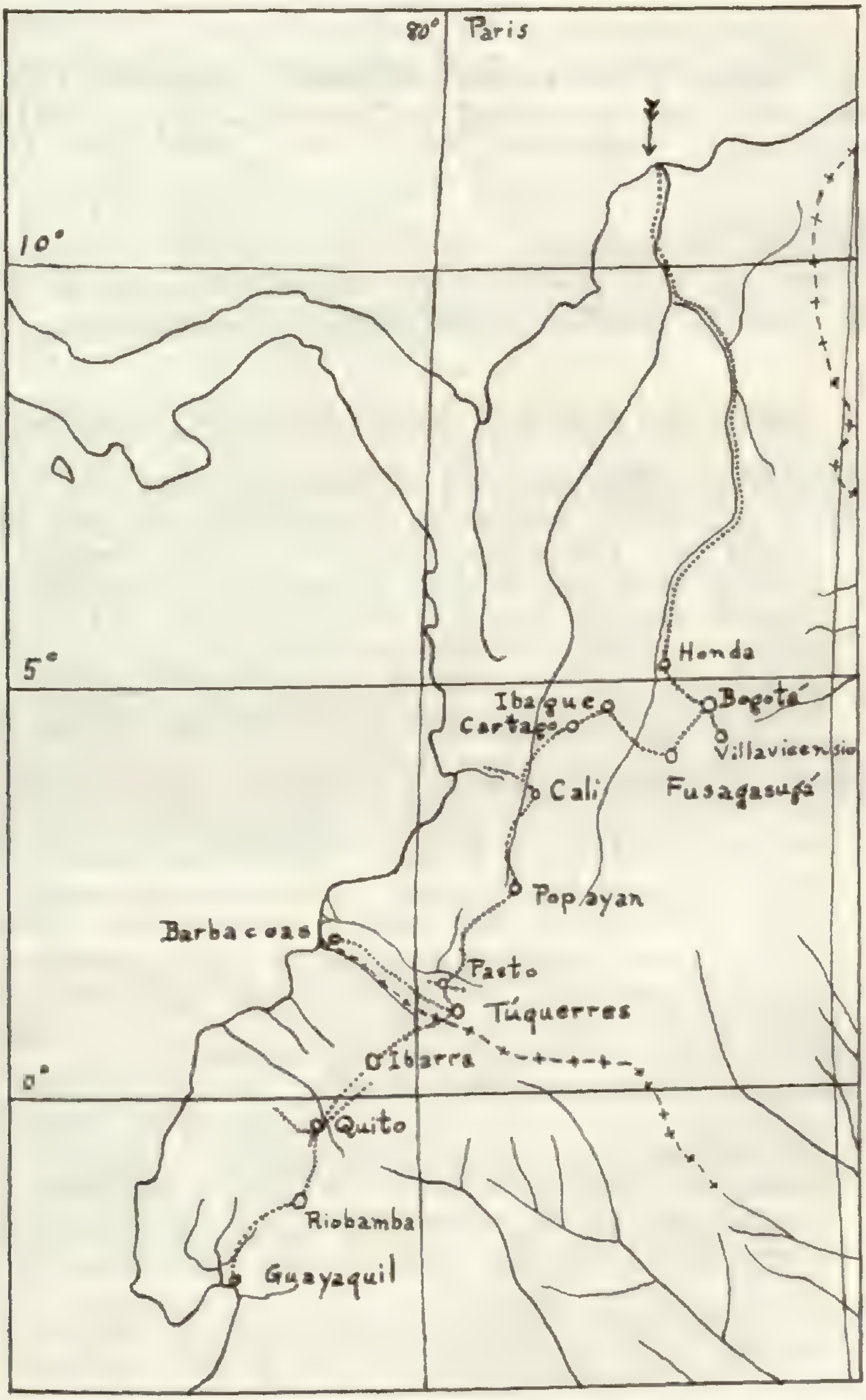


SMITHSONIAN INSTITUTION

# ARISTOLOCHIACEAE OF KENTUCKY *

Clyde F. Reed**

The species of the Aristolochiaceae in Kentucky fall into two complexes, which are designated by Fernald (1950, p. 562) as Asarum and Aristolochia. Blomquist (1957, p. 260) pointed out the anatomical differences between Asarum and Hexastylis and monographed the genus Hexastylis. Huber (1960, p. 549-550) distinguished Aristolochia, Isotrema and Endodeca. Based on these two taxonomic treatments, there are four genera of the Aristolochiaceae in the flora of Kentucky: Asarum, Hexastylis, Isotrema and Endodeca.

## Key to the genera of Aristolochiaceae in Kentucky

1. Stemless herbs, with creeping rhizomes; stamens 12.
   2. Leaves pubescent, membranous, persisting only one season, a single pair terminating branches of the superficial rhizome, broadly reniform; calyces hairy on the outside; lobes of calyces more or less attenuated; stamens with long filaments, the anther-connective extending in a long, pointed appendage; styles united except at the apex, the stigmas terminal on the spreading lobes; ovaries wholly inferior.....4. Asarum.
   2. Leaves essentially glabrous, coriaceous, persisting more than one season, usually a single leaf produced each year, cordate to reniform to deltoid; calyces glabrous on the outside; lobes of calyces not attenuated; stamens with very short filaments or the anthers sessile, the anther-connective at most extending in a short blunt appendage; styles separate, extending above the extrorse stigmas; ovaries superior or partly inferior.....3. Hexastylis.
1. Caulescent herbs, or twining shrubs; stamens 6.
   2. Plants vines, meters long, climbing into trees; the perianth 3-parted, the tube U-shaped, the unpaired limb-segment on the convex side without an utriculus; gynostemium thick, fleshy to cartilaginous with 6 anthers situated in twos on the back of the three gynostemial protuberances; fruit a septicidal capsule, opening from the base, vase-shaped.....1. Isotrema.
   2. Plants caulescent herbs; perianth 3-parted, the tube U-shaped, the unpaired limb-segment on the convex side with a dis-

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* Contribution to the Flora of Kentucky, No. 6.

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tinct utriculus; gynostemium thin, membranous, cup-shaped, 6 anthers, situated in twos on the back of the three gynostemial protuberances; fruit a septicidal capsule, opening from the tip, globular.....2. Endodeca.

1. ISOTREMA Raf., Journ. de Phys. Paris, 89: 102. 1819; H.Huber, München Bot. Staatssaml. Mitt., 3: 549-550. 1960 (Nov.).

Syn.: Siphisia Raf., Med. Flora, 1: 62. 1828; Hocquartia Dumortier, Comment. Bot., p. 30. 1822; Aristolochia L. sect Siphisia (Raf.) Duchartre, Ann. Sci. Nat., IV, 2: 29. 1854; Aristolochia L. sect. Hexodon Duchartre, Ann. Sci. Nat., IV, 2: 29. 1854.

Perianth three-parted; the tube U-shaped. the unpaired limb-segment on the convex side, without an utriculus, the middle tube part not narrowed downward; the perianth-tube completely glabrous on the inside or only in the lower part with thin tufted connected cob-webby hairs; climbing hairs absent or situated between the cob-webby hairs; limb three-parted, all the segments of the same kind or the unpaired segment raised and the paired segments fused half-way to each other; gynostemium thick, fleshy to cartilaginous with 6 anthers, which are situated in twos on the back of the gynostemial protuberances; fruit a septicidal capsule opening from the base, vase-shaped; raphe coming loose as a ring on the seed; secretory cells entirely absent in the epidermis of the foliage leaves or are limited to the food cells of the hairs; the hairs on the vegetative parts of the plant instead of the climbing hairs are longer hairs with short bases and small-celled shaft, these cells corresponding to the climbing hairs; chromosomes, 2n = 28.

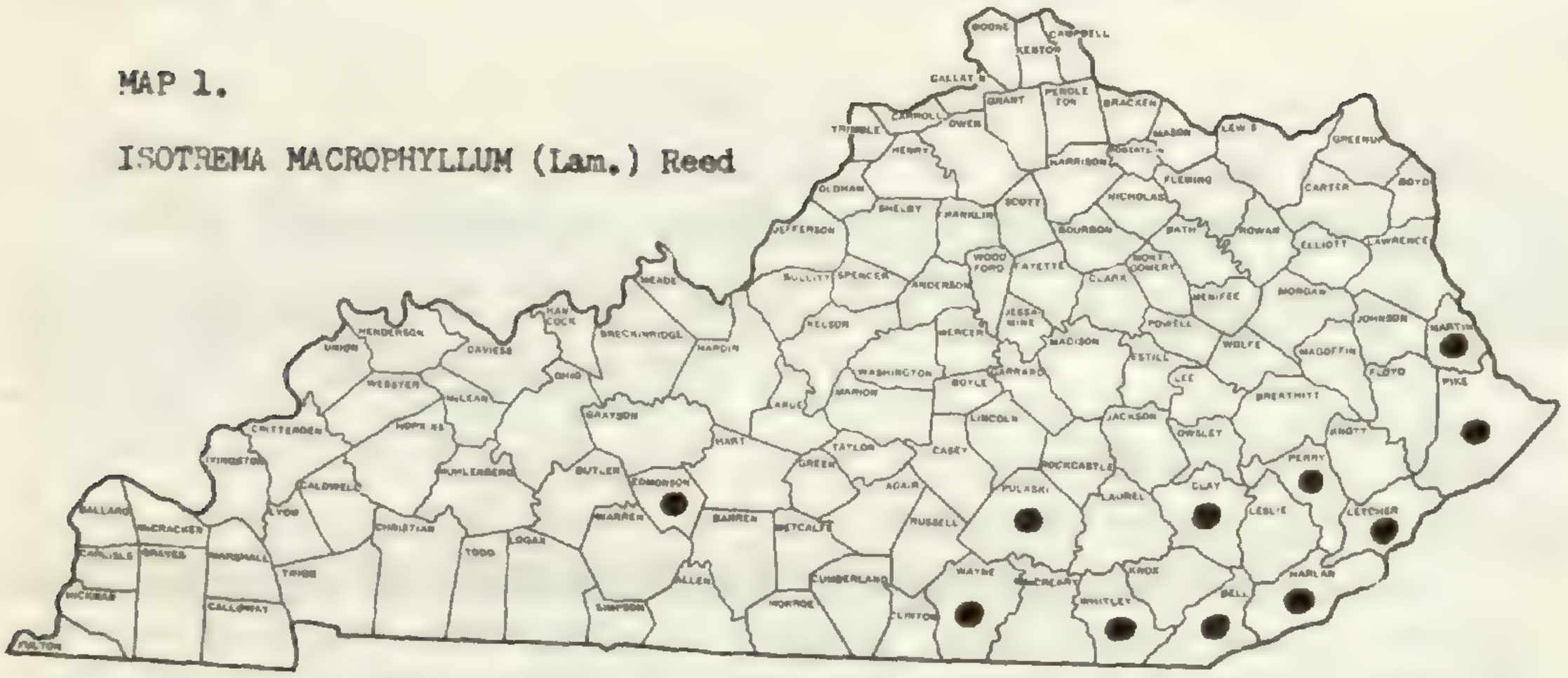
1a. ISOTREMA MACROPHYLLUM (Lam.) Reed, comb. nov. Map 1.

Syn.: Aristolochia macrophylla Lamarck, Encycl. 1: 252. 1783; Pfeifer, Baileya, 10: 4-7. 1962; Aristolochia durior Hill (Syst. Veg. 16: 57, t. 60. 1770), of most Amer. Auth., see Pfeifer, Baileya, 10: 4-7. 1962 for rejection of this name; Aristolochia sipho L'Heritier, Stirp. Nov., p. 13. 1785; Aristolochia frutescens Marshall, Arbust. Americ., p. 12. 1785; Isotrema durius (Hill) H.Huber, München Bot. Staatssamml. Mitt., 3: 550. 1960.

Since Pfeifer (1962, pp. 4-7) has pointed out that, "Since the work of the redoubtable Hill is conclusively a representative of neither A. macrophyllum nor A. tomentosum, nor any other species native to North America for that matter, it is recommended that the name be dropped as an epithet referable to the Aristolochiaceae", it becomes necessary to transfer Aristolochia macrophylla to Isotrema.

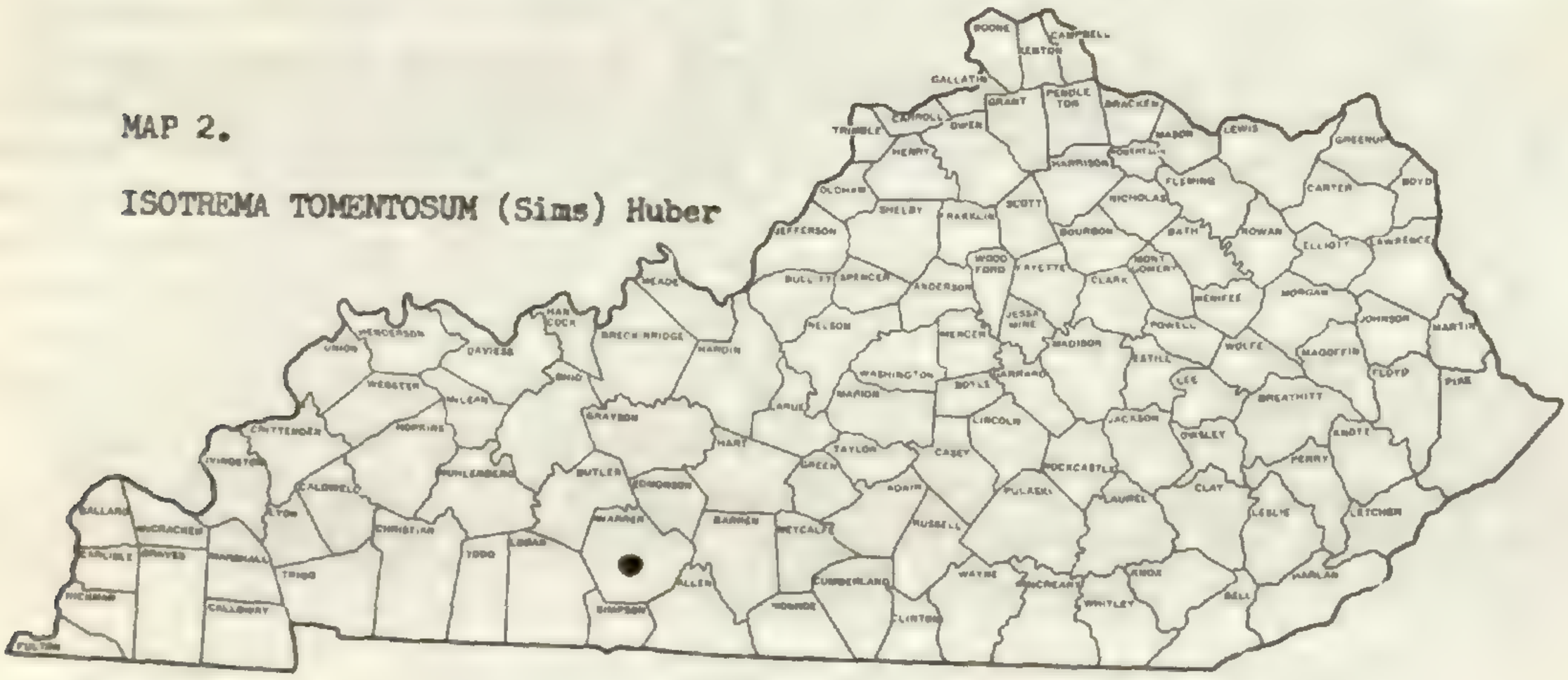
MAP 1.

ISOTREMA MACROPHYLLUM (Lam.) Reed



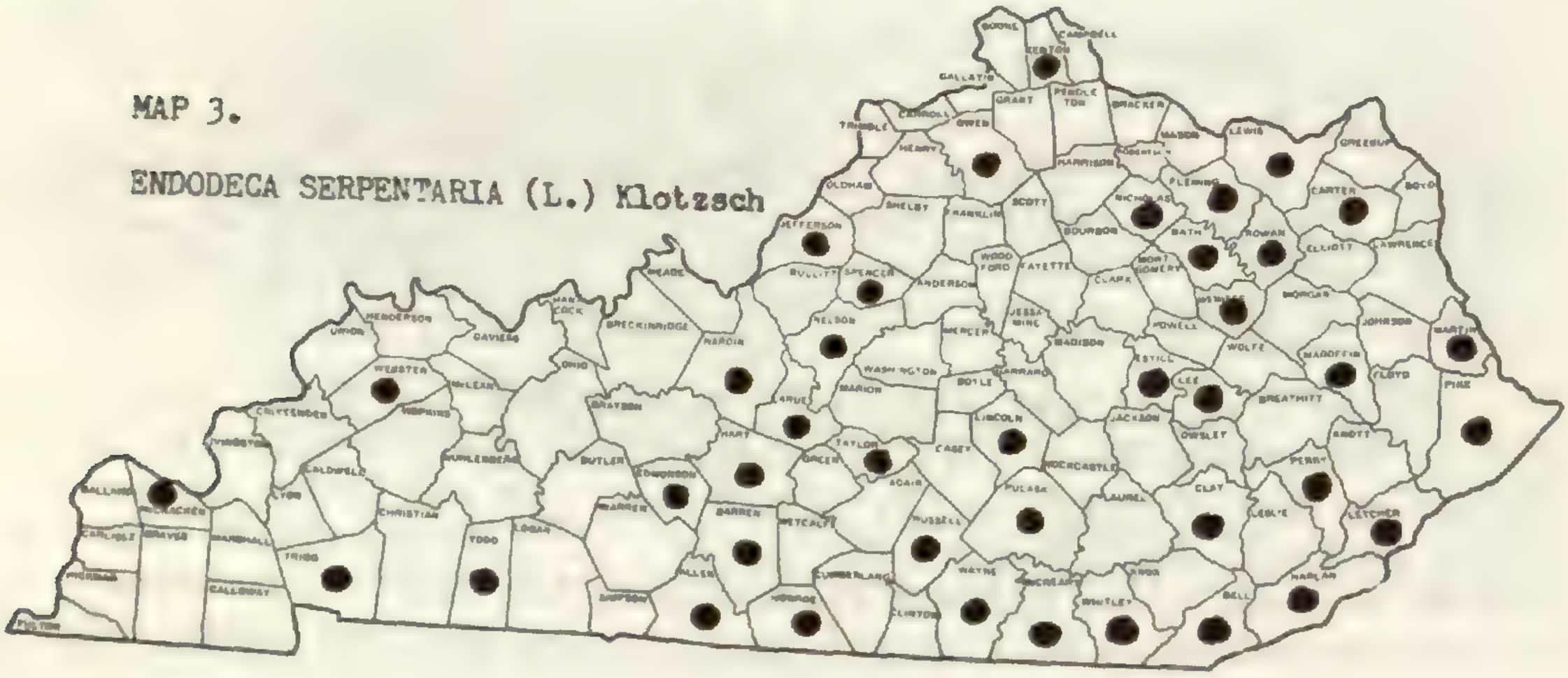
MAP 2.

ISOTREMA TOMENTOSUM (Sims) Huber



MAP 3.

ENDODECA SERPENTARIA (L.) Klotzsch



A high-twining shrubby vine, nearly glabrous; leaves cordate-ovate to cordate-reniform, abruptly pointed, up to 4 dm. across; flowers axillary, with a clasping leaf-like bract, borne along the stems; calyx up to 3 cm. long, strongly curved like a Dutch pipe, brown-purple, contracted at the mouth, with abrupt flat obscurely 3-lobed limb; capsule cylindric-ovoid, 5-8 cm. long, about 2.5 cm. in diameter, firm, the valves separating only in age, pendant on peduncles up to 20 cm. long.

The Dutchman's Pipe or Pipe-vine grows in rich woods in the mountainous areas from western Maryland, southwestern Pennsylvania and West Virginia, south in the mountains to North Carolina, Georgia and Alabama, and westward into Ohio, Kentucky and Tennessee; also it is much cultivated northward and eastward into New England and New Jersey for shade on porches. In Kentucky this species is found mainly in the southeastern portion of the state, along Black Mt. and the Cumberlands, west at least as far as Mammoth Cave in Edmonson County.

Representative specimens from Kentucky: Bell Co.: Pine Mt. Sept. 1893. T.H.Kearney, Jr. 591. (US-796881); along Cumberland River. Sept. 1893. T.H.Kearney, Jr. 591. (US-18250 and 18251); Edmonson Co.: Nolin River, deep alluvium on river bank, Mammoth Cave Nat. Park. Oct. 2, 1949. Henry W. Lix 660. (US-2030592); Letcher Co.: 4 mi. E of Whitesburg. Sept. 13, 1941. F.T.McFarland 60. (US-1874138); 5 mi. E of Whitesburg on way to Jenkins. May 19, 1940. F.T.McFarland 4527. (US-1929160); Perry Co.: 5 mi. E of Hazard. Sept. 27, 1940. F.T.McFarland & H.J.Rogers 4665. (US-1862712); Wayne Co.: Beaver Creek, SW of Monticello. July 12-14, 1937. L.B.Smith & A.R.Hodgdon 3927. (US-1725789); Pike Co.: On Poplar Creek near Majestic, Rt. 194. June 14, 1962. Clyde F. Reed; Martin Co.: Introduced in woods at Lovely by Rufus Reed. Aug. 9, 1965. Clyde F. Reed. Braun (1943, p. 50) lists this species from Bell, Clay, Harlan, Letcher, Pulaski and Whitley Counties.

1b. ISOTREMA TOMENTOSA (Sims) H.Huber, München Bót. Staatssamml. Mitt., 3: 550. 1960. Map 2.

Syn.: Aristolochia tomentosa Sims, Bot. Mag., 33: t. 1369. 1811; Fernald, Manual of Botany, 8th ed., p. 565. 1950.

A high-twining shrubby vine, in which the young branches, lower surfaces of the leaves and the flowers are densely white-pubescent; leaves ovate to round-reniform, blunt, the blades on the fertile branches up to 1.5 cm. long; peduncles of the flowers downy, but bractless; calyx yellowish, with an oblique dark purple orifice and a rugose reflexed limb; capsules about 3 cm. in diameter.

The Downy Dutchman's Pipe ranges from Florida and eastern Texas, north to North Carolina, southwestern Indiana, southern Illinois, Missouri and southeastern Kansas; and naturalized locally to western New York. In Kentucky it is known from a single collection.

Representative specimen from Kentucky: Warren Co.: On river bluff, Bowling Green. May 23, 1900. Sadie F. Price. (US-966268).

2. ENDODECA Raf., Medic. Flora, 2: 62. 1828;
emend. Klotzsch, Monatsber. Akad. Berlin, 1859: 600. 1859;
H.Huber, München, Bot. Staatssamml. Mitt., 3: 549. 1960.

Syn.: Aristolochia sect. Asterolytes Duchartres, Ann. Sci. Nat., IV, 2: 29. 1854; De Candolle, Prodr. 15(1): 433. 1864.

Perianth three-parted; the tube U-shaped, the unpaired limb-segment on the convex side with a distinct utriculus; the inside of the utriculus with thin tufted connected cob-webby hairs, the upper tube glabrous on the inside except on the convex side of the middle portion; climbing hairs on the inside of the tube present, in the utriculus and on the convex side of the upper tube; limb three-parted, the unpaired segment somewhat raised, the paired segments plainly fused with one another; gynostemium thin-membranous, cup-shaped with 6 anthers, situated in twos on the back of the three gynostemial protuberances; fruit a septicidal capsule opening from the tip, globular; secretory cells entirely absent in the epidermis of the foliage leaves; hairs in the vegetative parts instead of the climbing hairs, there are longer hairs with short bases and small-celled shafts, these cells corresponding to the climbing cells; chromosomes, 2n = 28.

2a. ENDODECA SERPENTARIA (L.) Klotzsch, Monatsber. Akad. Berlin, 1859: 600. 1859; H.Huber, München Bot. Staatssamml. Mitt., 3: 551. 1960. Map 3.

Syn.: Aristolochia serpentaria L., Sp. Pl., p. 961. 1753.

Herb, 1-4.5 dm. tall, with slender, erect stems and a knotty rhizome; leaves ovate to ovate-oblong, cordate at the base, acuminate, slender-petioled, the blades up to 14 cm. long and 7 cm. wide; flowers on short slender-bracted basal branches, rarely at the summit of the stem; calyx strongly curved, 1-1.5 cm. long, deep purple to brownish, the broad flaring limb obtusely three-lobed; capsule ellipsoid to subglobose, 0.8-1.3 cm. long; seeds obovoid, 4-5 mm. long.

The Virginia Snakeroot grows from Florida to Texas, northward to southwestern Connecticut, southeastern New York, Ohio, Indiana, southern Illinois, central Missouri and southeastern Kansas. It is found scattered throughout Kentucky, as noted on map 3. It grows in rich and often calcareous woods; very frequently in low woods.

Representative specimens from Kentucky: Bath Co.: Dry woodland, Salt Lick. May 27, 1903. (US-966238); woods, Rt. US 60, 2 mi. W of Salt Lick, near The Knobs. Aug. 21, 1961. Reed 52943; Carter Co.: Cascade Caves, E of Tygarts River. July 4, 1937. L.B.Smith et al, 3474. (US-1717205); Edmonson Co.: Mill Creek, forest on stream slope, Mammoth Cave Nat. Park. June 2, 1949. Henry W. Lix 633. (US-2030565); Estill Co.: Irvine. May 17, 1903. (US-966259); Harlan Co.: Pine Mt. Aug. 1893. T.H.Kearney, Jr. 84. (US-796879); Nicholas Co.: Blue Lick State Park, Rt. US 68 at Rt. Ky 165. Aug. 15, 1961. Reed 52296; woods along Licking River at Blue Licks, Rt. 68. Aug. 15, 1961. Reed 52315; Wayne Co.: woods, 3-4 mi. E of Monticello. June 1962. John Simpson #4. (Reed Herb. 43022); Webster Co.: Swampy woods, Rt. 132, near Clay, on Lynn Fork Creek. June 18, 1962. C.F.Reed; Martin Co.: Woods in ravine, at Lovely. Aug. 1965. C.F.Reed & Rufus Reed. Braun (1943, p. 50) gives the following counties: Allen, Barren, Bell, Carter, Clay, Edmonson, Fleming, Hardin, Harlan, Hart, Jefferson, Kenton, Larue, Lee, Letcher, Lewis, Lincoln, Magoffin, McCracken, Monroe, Nelson, Nicholas, Owen, Perry, Pike, Pulaski, Rowan, Russell, Spencer, Taylor, Todd, Trigg, Wayne, Whitley. It is known in 40 of the 120 counties in the state.

3. HEXASTYLIS Raf., Neogenyt., p. 3. 1825; Blomquist, Brittonia, 8(4): 255-281. 1957; Reed, Phytologia, 12(6): 321-330. 1965.

Syn.: Asarum sect. Ceratasarum A.Br., Index Sem. Horti Berol., App., p. 12. 1864.

Herbs with rhizome at or near surface of ground; leaves essentially glabrous, coriaceous, and persisting more than one season, one leaf borne each season; leaves reniform, cordate-ovate, subhastate or triangular-cordate, long-petioled, evergreen, dark green, often mottled with white between or along the veins; calyces glabrous on the outside, lobes of the calyx not attenuated; vestiges of petals absent; stamens with very short filaments or the anthers sessile; anther-connective at most extending in a short blunt appendage; ovary superior to partly inferior, the styles separate, extending above the extrorse stigmas.

Only two species of this genus have been recorded from Kentucky, namely, H. arifolia var. ruthii and H. virginica.

3a. HEXASTYLIS ARIFOLIA var. RUTHII (Ashe) Blomquist, Brittonia, 8(4): 268. 1957; Reed, Phytologia, 12(6): 330. 1965. Map 4.

Syn.: Asarum ruthii Ashe, Jour. Elisha Mitchell Soc., 14: 35-36. 1897; Hexastylis ruthii (Ashe) Small, Flora Southeastern United States, p. 1137. 1903.

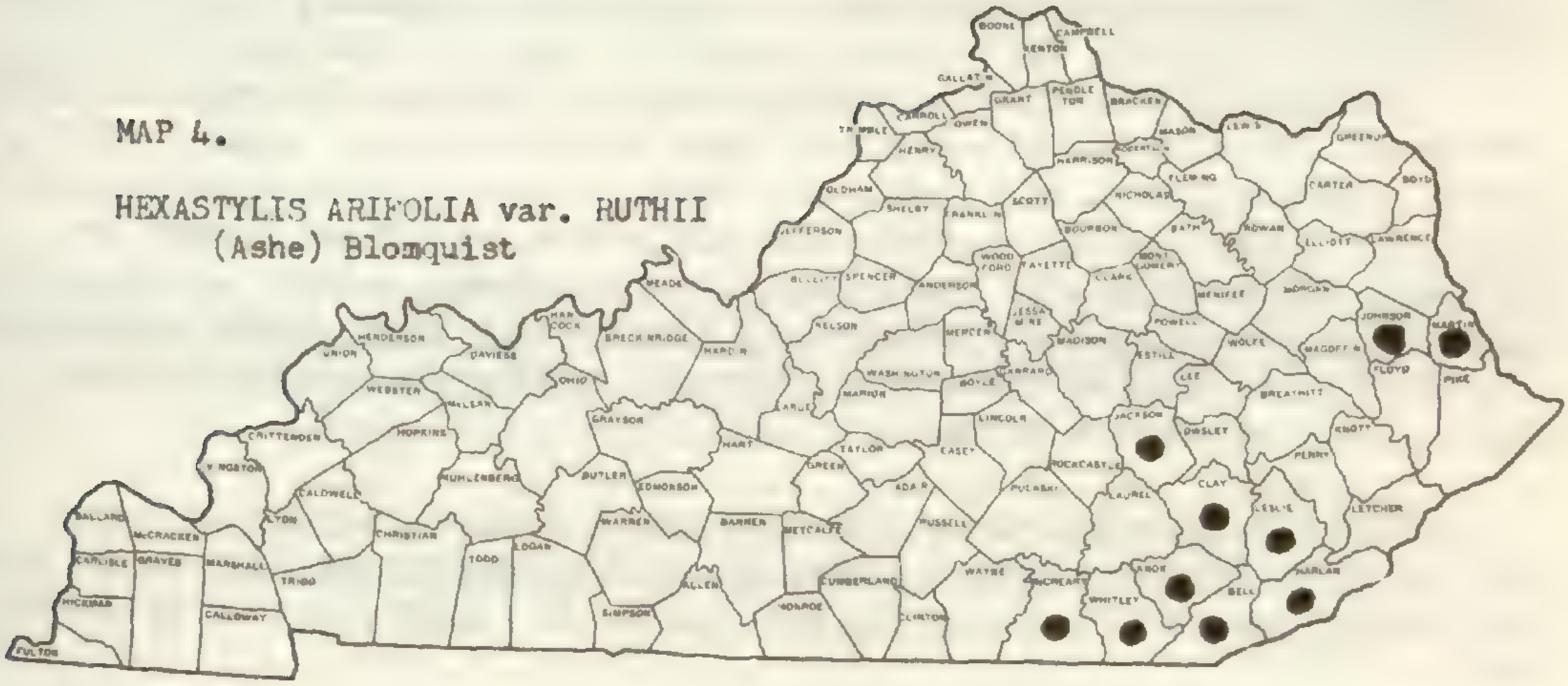
Leaf-blade deltoid, subhastate or triangular-cordate, up to 1.6 dm. long and 1.5 dm. broad, the broad sinus up to 5 cm. deep, one-third to two-fifths the length of the blade; calyx slenderly ovoid, 1-2 cm. long, gradually tapering from the base of the scarcely constricted summit, the erect lobes only 1-3 mm. long and forming a short narrowed beak; anther-connective prolonged to a point.

The Arum-leaved Ginger or Heartleaf is found in southwestern Virginia and southeastern Kentucky, south in the mountains to Alabama, growing in mesophytic woods.

Representative specimens from Kentucky: Bell Co.: Pinewoods, Pine Mt. State Park. April 9, 1949. Priscilla Gibson (Reed 14625); Harlan Co.: Pine Mt. Stone. May 1919. (DUKE; PA); woods near Baxter, Pine Mt. July 5, 1947. Reed 8156; Jackson Co.: Woods just W of Elias, Rt. 30. Aug. 28, 1959. Reed 45369; woods just NE of Tyner. April 10, 1948. Reed 11084; Johnson Co.: Woods, Toms Creek near Nippa. Aug. 10, 1965. C.F.Reed (71391) and Rufus Reed; Knox Co.: Woods near Davis Bend, 3 mi. S of Barbourville. April 26, 1947. Reed 6621 and 6657; Sampson Hill near Barbourville. April 25, 1947. Reed 6584 and Jan. 9, 1947. Reed 6468; hillsides west of Barbourville. Jan. 11, 1947. Reed 6477; woods, Dishmans Springs. 7 mi. NW of Barbourville. June 1, 1947. Reed 7190; woods along Indian Creek near Barbourville. May 17, 1947. Reed 6810; Indian Creek. April 27, 1947. Reed 6637; Leslie Co.: Hemlock woods, W of Bledsoe. July 5, 1947. Reed 8138; Martin Co.: Woods, Lovely. June 20, 1965. Rufus M. Reed (Reed Herb. No. 55357); Introduced from Johnson Co.; Lovely. Aug. 10, 1965. Reed 71399; McCreary Co.: S of Pine Knot. Lucy Braun. June 14, 1935 (GH); wet sandstone woods along South Fork of Cumberland River, near Yamacraw. Dec. 30, 1955. Reed 36904; woods alove Cumberland Falls. Aug. 9, 1949. Reed 16324; Wherry's Bog, S of Strunk, Rt. 27. Aug. 10, 1950. Reed 21021; woods near Lygodium palmatum on Jenny's Creek, between Sand Hill and Whitley City. Oct. 23, 1949. Reed 18103; ravine at Yamacraw. April 15, 1950. Reed 18547; Whitley Co.: Cumberland Falls. Lucy Braun. June 25, 1936. (GH); rockhouses, Trail No. 2, Cumberland Falls State Park. July 2, 1950. Reed 20309. Braun (1943, p. 50) lists this species from the following counties: Bell, Clay, Johnson, Leslie, McCreary and Whitley.

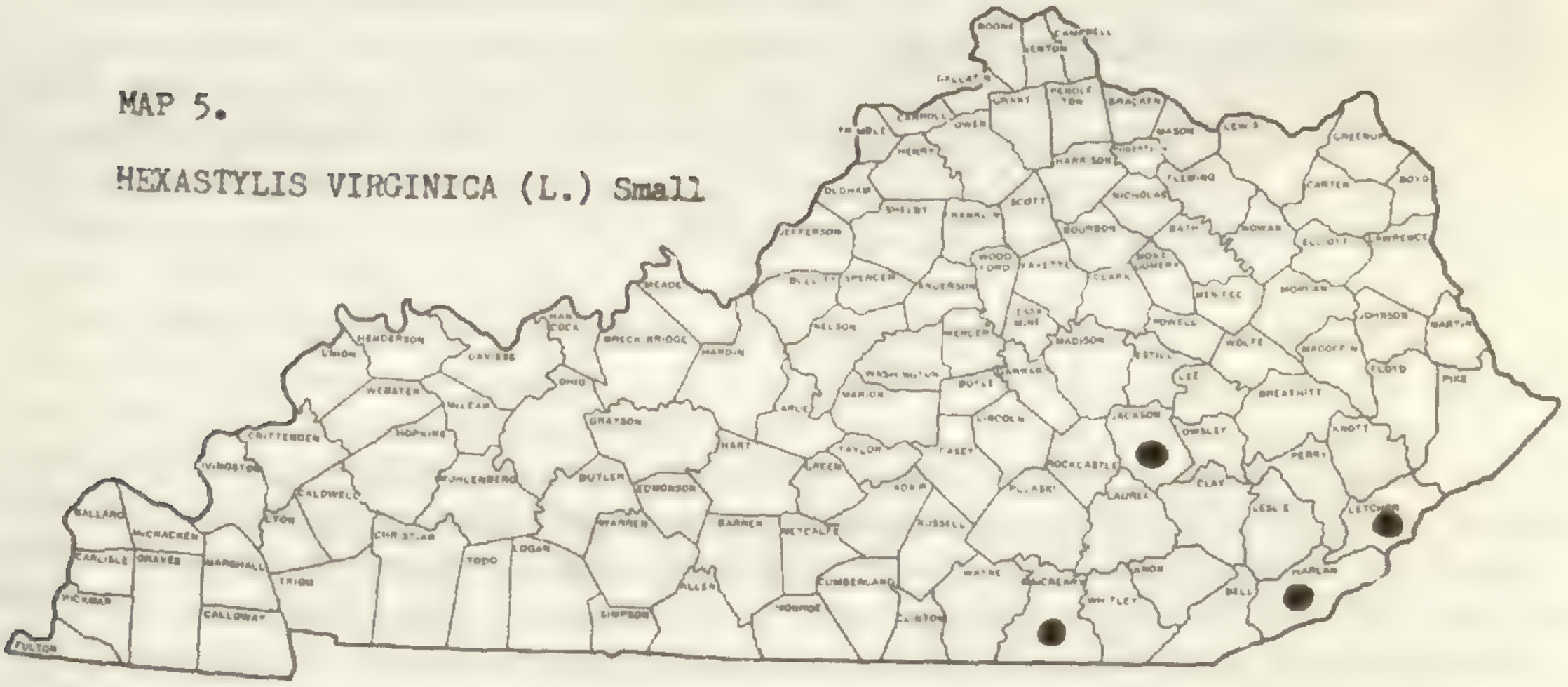
MAP 4.

HEXASTYLIS ARIFOLIA var. RUTHII
(Ashe) Blomquist




MAP 5.

HEXASTYLIS VIRGINICA (L.) Small



3b. HEXASTYLIS VIRGINICA (L.) Small, Flora Southeastern United States, p. 1131. 1903; Blomquist, Brittonia, 8(4): 277. 1957; Reed, Phytologia, 12(6): 323-325. 1965. Map 5.

Syn.: Asarum virginicum L., Sp. Pl., p. 442. 1753; Heterotropa virginica (L.) A.Gray, Lond. Jour. Bot., 1: 225. 1842; Asarum menningeri Ashe, Jour. Elisha Mitchell Soc., 14: 35. 1897; Hexastylis menningeri (Ashe) Small, in Britton, Manual, p. 348. 1901.

Leaf-blade reniform to cordate-ovate, long-petioled, coriaceous, evergreen, the blades 2.5–9.5 cm. long and 2–8.5 cm. broad, with a narrow sinus up to 3 cm. deep, one-third to two-fifths the length of the blade; calyx-lobes broadly campanulate-urceolate, fleshy or leathery, dark purple to fuscous, 3–3.5 mm. long, erect or slightly spreading, the ridged-reticulations inside the calyx-tube consisting of a close, irregular network of ridges; anther-connective blunt; ovary about one-third inferior.

The Virginia Heart-leaves are found from eastern Virginia, west to West Virginia and southeastern Kentucky, south to South Carolina and Tennessee, growing in acid soils of sandy, peaty or rocky woods.

Representative specimens from Kentucky: Harlan Co.: Woods, Rt. 66 on Black Mt. nr. the Virginia line (Lee Co.). June 21, 1947. Reed 7735A; Jackson Co.: Woods just NE of Tyner. April 10, 1948. Reed 11085A. Braun (1943, p. 50) lists the following counties: Harlan, Letcher and McCreary.

4. ASARUM Linn., Sp. Pl. 1: 442. 1753.

Syn.: Asarum sect. Euasarum A.Br., Index Sem. Horti Berol., App., p. 12. 1861.

Herbs with a superficial rhizome; leaves pubescent, membranous, persisting only one season, a pair of leaves terminating the branches of the rhizome; leaves broadly reniform with a broad open sinus, medium to dark green, dull; calyces brown-purple, campanulate, hairy on the outside, the lobes of the calyces more or less attenuated; vestiges of the petals sometimes present; stamens with long filaments; anther-connective extending in a long, pointed appendage; ovary wholly inferior, the styles united at the apex, the stigmas terminal on the spreading lobes.

4a. ASARUM CANADENSE Linn., Sp. Pl., 1: 442. 1753.

Plants soft-pubescent, especially along the petioles and on the outside of the calyces, with an elongating, creeping rhizome,

terminating in a pair of deciduous broadly reniform leaves; leaf-blade dull green, with a broad open sinus, often abruptly short- acuminate, or suborbicular or round-ovate with a closed sinus and broadly round-tipped, 0.6-1.8 dm. broad when mature; calyx campanulate, brown-purple on the inside, the calyx-lobes wholly adnate to the ovary, the tips inflexed in the bud; filaments slender, much longer than the short anthers; style barely 6-lobed at the summit, with 6 radiating thick stigmas. Freely integrating varieties may be distinguished in the following manner for specimens found in Kentucky, based on Fernald's distinctions.

1. Calyx-lobes with caudate tips 0.5-2 cm. long.
   2. Lobes deltoid- to oblong-ovate, 1-2.5 cm. long, narrowed to a slender tip 0.5-1.5 cm. long.....
   .....4a. A. canadense (typical).
   2. Lobes narrowly to broadly lance-attenuate, 1.5-2.5 cm. long, tapering gradually from the base to a slender tip.....4b. A. c. var. acuminatum.
1. Calyx-lobes scarcely caudate-tipped or merely mucronate; lobes deltoid, 5-12 mm. long, abruptly reflexed.....
   .....4c. A. c. var. reflexum.

4a. ASARUM CANADENSE Linn. (Typical). Map 6.

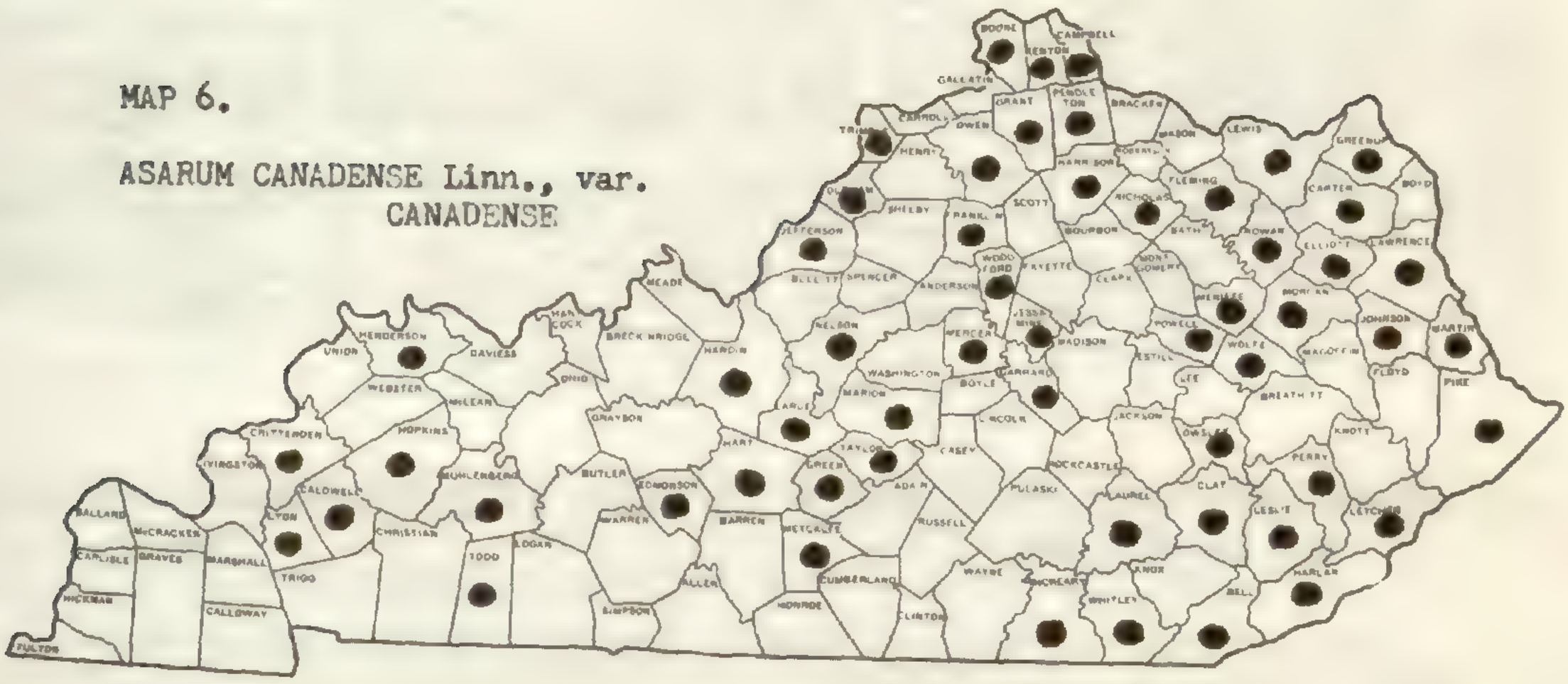
The typical form of the Wild Ginger is the most common form to be found in Kentucky. It grown best on rocky mesophytic slopes, along rivers and creeks in low woodlands, practically throughout the state, except west of the Cumberland and Tennessee Rivers in western Kentucky, in the western coalfields and in the Silurian-Devonian Knobs. Fernald gives the natural distribution in eastern North America, as from the Gaspe Peninsula and Quebec to Minnesota, and south to North Carolina, Kentucky and Illinois. The typical form has been recorded in 58 of the 120 counties in the state. I have collected specimens in 39 counties, 23 of which are in addition to the 35 counties recorded by Dr. Lucy Braun (1943, p. 50).

Representative specimens from Kentucky: Bell Co.: Deep ravine on Rt. 21 near Crockett. July 2, 1947. Reed 8071; Caldwell Co.: Mill Bluff near Fredonia. April 17, 1949. Dottie King (Reed Herb. 55180); Campbell Co.: Woods along creek, Rt. 10, 7 mi. SE of Alexandria. Aug. 24, 1959. Reed 44699; Carter Co.: Woods, 1 mi. E of Lawton. April 24, 1949. Reed 14731; woods along road to Carter City, Carter Caves. May 28, 1950. Reed 19556; hillsides near Carter Caves. April 22, 1948. Reed 12139 and 12162; woods along Tygarts River. May 12, 1949. Reed; limestone woods near Tygarts River, Carter Caves. April 9, 1950.18375; Crittenden Co.: Woods on Brantley Creek near Hood. April 30, 1950. Reed 19047; Edmondson Co.: Green River Bluff Trail

Mammoth Cave Nat. Park. April 10, 1947. H.W.Lix 137. (US-1970416). Note by Carolyn Stone -- "varying toward var. reflexum"; Elliott Co.: Damp hillsides at Laurel Bridge near Sandy Hook. April 20, 1948. Reed 12219; rocky hillsides, Blaze. April 30, 1949. Reed 14778; Franklin Co.: Rocky hillsides, 1 mi. E of Alton. April 24, 1948. Reed 12332; Garrard Co.: Woods along Kentucky River, Rt. 27, N of Bryantsville. April 22, 1950. Reed 42486; Grant Co.: Woods at Head of Rays Fork, Rt. 330, 1.5 mi. W of Corinth. June 21, 1962. Reed 57145; Green Co.: Wooded ravine along Little Bird Creek, Rt. 61 near Allendale. Aug. 26, 1959. Reed 45106; woods, Rt. 61, near Green River. April 15, 1950. Reed 18481; Hardin Co.: Limestone woods near Arch. April 30, 1950. Reed 18980; Harlan Co.: Woods near Baxter, Pine Mt. July 5, 1947. Reed 8150; shaded wet ledges near Coxton. May 4, 1947. Reed 6697B and 6697A; Harrison Co.: Wooded slopes along Licking River, N of Cynthiana. Aug. 15, 1961. Reed 52347; Hopkins Co.: Hillsides near Nortonville. April 28, 1950. Reed 18890; Jefferson Co.: Hillside along Harrods Creek. April 1949. Blanche Rose. (Reed Herb.55172); Jessamine Co.: Limestone ledges along Kentucky River at High Bridge. April 17, 1949. Reed 14662; limestone woods along Jessamine Creek, Christmans Cave. April 3, 1949. Reed 14589; damp woods at High Bridge. April 24, 1948. Reed 12392; Johnson Co.: At cold spring, Drake Creek. April 22, 1950. Earl Skaggs 138. (Reed Herb. 14383); woods near Flat Gap. May 1, 1948. Reed 12467; woods, Toms Creek near Nippa. Aug. 10, 1965. Reed 71394; Larue Co.: Woods along Rolling Fork River, Rt. 84 just W of Larue-Nelson Co. line. April 23, 1950. Reed 18704; Laurel Co.: Damp woods along Rockcastle River at Rt. 80. July 11, 1954. Reed 33592; Lawrence Co.: Woods, Rt. 32 between Adorn and Busseyville. May 7, 1950. Reed 19495; woods 5 mi. S of Blaine. Oct. 15, 1949. Reed 17738; woods along Rt. 32 near Lawrence-Elliott Co. line. May 7, 1950. Reed 19532; Lewis Co.: Silurian limestone near Lock 32 between Vanceburg and Concord, along Ohio River. Aug. 5, 1950. Reed 21512; hillside near Stricklett. April 1949. Blanche Rose. (Reed Herb. 55173); Lyon Co.: Wooded slopes, Kuttawa Springs. Aug. 11,1949. Reed 16138; same loc., April 30, 1950. Reed 19070 and 19067; Marion Co.: Limestone bluffs, Rt. 84, W of Raywick near Prather Creek. April 23, 1950. Reed 18685; Martin Co.: Woods, Lovely. June 20, 1965. Rufus M. Reed. (Reed Herb. 55355 and 55356); McCreary Co.: Deep ravine, Yamacraw. April 15, 1950. Reed 18574; Menifee Co.: Hillsides along Ratliff Creek, 2 mi. W of Scranton. April 21, 1949. Reed 14677; wooded hillside along Rt. 77, Red River Valley. Sept. 25, 1949. Reed 17438; Mercer Co.: Woods along Kentucky River, Rt. 68, near Shakertown. April 22, 1950. Reed 42492; Metcalfe Co.: Woods. June 28, 1947. Reed 7906; Morgan Co.: Deep woods, Grassy Creek. May 14, 1950. Ralph Perkins 13. (Reed Herb. 55198); Muhlenburg Co.: Woods W of Rockport. April 28, 1950. Reed 18912; Nelson Co.: Damp hillsides, ravines by Buffalo Creek, Rt. 62, S of Bardstown. May 14, 1950. Reed 20124; Owsley Co.: Woods, 2 mi. E of Green Hall P.O., Rt. 30 at Rt. 846. Aug. 28, 1959. Reed 45402; Pendleton Co.: Woods just E of Falmouth. July 16, 1954. Reed 33843; Pike Co.: Shady hillsides just N of Pikeville. July 10, 1954. Reed 33664; Robertson Co.: Woods 9 mi. E

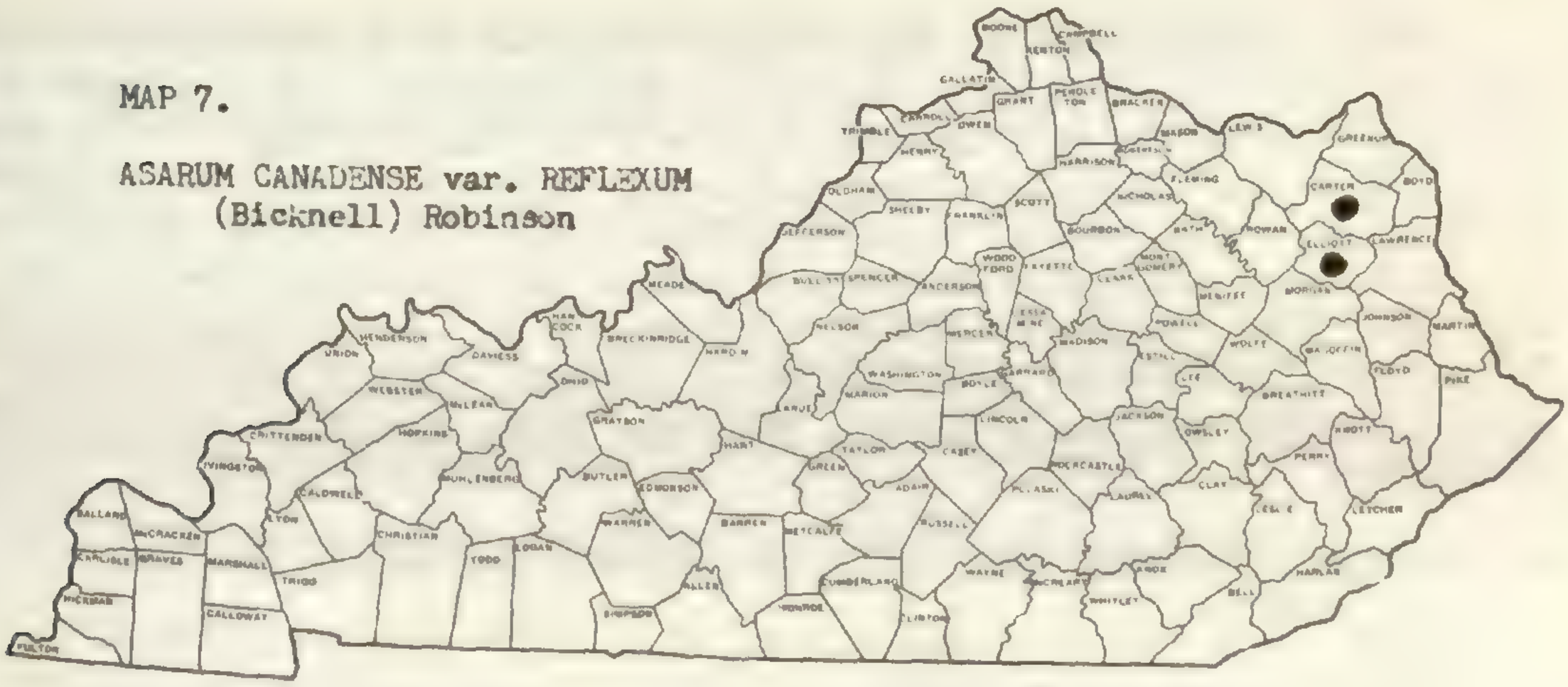
MAP 6.

ASARUM CANADENSE Linn., var.
CANADENSE



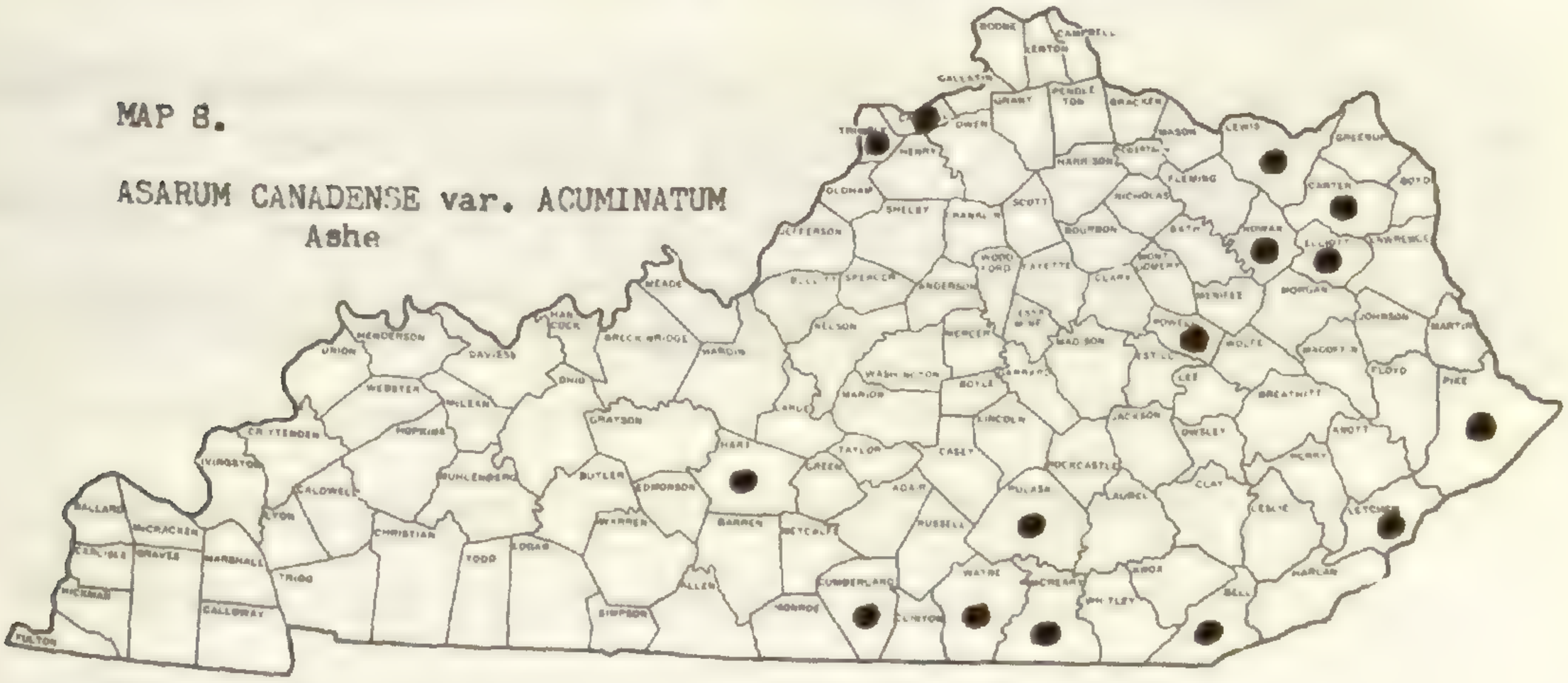

MAP 7.

ASARUM CANADENSE var. REFLEXUM
(Bicknell) Robinson




MAP 8.

ASARUM CANADENSE var. ACUMINATUM
Ashe



of Blue Licks. May 6, 1950. Reed 19907; Trimble Co.: Woods, limestone, along Ohio River, 2 mi. W of Milton. Aug. 25, 1959. Reed 44854; Rowan Co.: Woods, Big Perry Mt. May 7, 1948. Reed 12634; ravine, 1 mi. S of Clearfield. Nov. 7, 1947. Reed 10770; woods, Hamm. May 3, 1950. Reed 19156; woods along Caney Creek, 3 mi. E of Elliottsville. May 4, 1950. Reed 19122; hillside at Big Brushy Creek along Flemmingsburg Road. May 2, 1950. Reed 19090; woods along North Fork of Triplett Creek, 3 mi. N of Morehead. May 14-15, 1942. M.S.C.Class. (Reed Herb. 55177 and 55178); rocky hillsides along North Fork of Triplett Creek. May 14, 1950. Fred Netherly 109. (Reed Herb. 4369 and 4370); Wolfe Co.: Woods, Glady Creek. Oct. 2, 1949. Reed 17584; Woodford Co.: Woods along Rt. 326, Clifton. April 22, 1950. Reed 18830.

4b. ASARUM CANADENSE var. ACUMINATUM Ashe, Contrib. from My Herbarium, No. 1: 2. 1897. Map 8.

Syn.: Asarum acuminatum (Ashe) Bickn., in Britton & Brown, Illus. Flora, 3: 513. 1898.

This variety of our Wild Ginger is known from Vermont to Minnesota and south to Virginia, Tennessee and Missouri. In Kentucky it is not so common as the typical form and is found mostly in the eastern half of the state from Larue County, eastward along the southern counties to Bell, Letcher and Pike Counties; to the north it has been recorded in several northeastern counties and from the area along the Ohio River to the southwest of Cinncinati. Braun records it from following 15 counties: Bell, Carroll, Carter, Cumberland, Elliott, Hart, Letcher, Lewis, McCreary, Menifee, Pike, Pulaski, Rowan, Trimble and Wayne.

4c. ASARUM CANADENSE var. REFLEXUM (Bickn.) Robinson, Rhodora, 10: 32. 1908.

Syn.: Asarum reflexum Bickn., Bull. Torr. Bot. Club, 24: 531, 533, pl. 317. 1897.

This variety of the Wild Ginger is uncommon in Kentucky, being only recorded from Carter and Elliott Counties by Braun. It is known from Connecticut to southeastern Manitoba and southward to North Carolina, Georgia, Alabama, Kentucky and Missouri. Carolyn Stone notes that the specimens listed above under var. canadense from Edmonson Co., collected by H.W.Lix 137, varies toward this variety.

# NEW COMBINATIONS IN THE FAMILY ACANTHACEAE

Dieter C. Wasshausen

During the course of study of the family Acanthaceae for Dr. Lundell's Flora of Texas the author has found it necessary to change several taxa, resulting in the following new name and new combinations:

CARLOWRIGHTIA TORREYANA Wasshausen, nom. nov.

Schaueria parvifolia Torr. U.S. & Mex. Bound. Bot. 122. 1859.

Not Carlowrightia parvifolia T.S. Brandeg. 1911.

Dianthera parvifolia (Torr.) A. Gray, Syn. Fl. N. Am. $2^1$:330. 1878.

Carlowrightia pubens A. Gray, Proc. Am. Acad. 21:406. 1886.

Nomen illegit, published as a synonym of Dianthera parvifolia.

Croftia parvifolia (Torr.) Small, Fl. Southeast. U.S. 1088, 1338. 1903.

CARLOWRIGHTIA PARVIFLORA (Buckl.) Wasshausen, comb. nov.

Schaueria parvifolia Torr. U.S. & Mex. Bound. Bot. 122. 1859.

Not Carlowrightia parvifolia T.S. Brandeg. 1911.

Drejera parviflora Buckley in Proc. Acad. Philad. 462. 1861.

Dianthera parviflora (Buckl.) A. Gray, Syn. Fl. N. Am. $2^1$:330. 1878.

Croftia parvifolia (Torr.) Small, Fl. Southeast. U.S. 1088, 1338. 1903.

STENANDRIUM FASCICULARIS (Benth.) Wasshausen, comb. nov.

Ruellia dulcis Cav. Icon. 6:62, 585, f.2. 1801.

Crossandra ? fascicularis Benth. Hartw. 22: 1839.

Stenandrium dulce (Cav.) Nees in DC. Prod. 11:282. 1847.

Stenandrium dulce (Cav.) Nees var. floridanum A. Gray, Syn. Fl. N. Am. $2^1$:327. 1878.

Stenandrium floridanum (A. Gray) Small, Fl. Southeast. U.S. 1:1085, 1338. 1903.

Gerardia dulcis (Cav.) Blake, Contrib. Gray Herb. 52:101. 1917.

Smithsonian Institution, Washington, D.C.

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## TWO NOVELTIES IN THE VERBENACEAE

Harold N. Moldenke

ALOYSIA SONORENSIS Moldenke, sp. nov.

Frutex desertorum; ramis ramulisque gracilibus minutissime cinereopuberulis; foliis ellipticis ad apicem rotundatis vel subacutis plerumque obscure 3-denticulatis vel emarginatis, ad basin acutis, utrinque dense cinereopuberulis; spicis fructiferis abbreviatis conspicue bracteatis.

Desert shrub; branches, branchlets, and twigs slender, densely but very minutely gray-puberulent throughout; principal internodes abbreviated, 1—4 cm. long; leaves decussate-opposite, but mostly more or less clustered on much abbreviated twigs at each node; petioles very short, 1—2 mm. long, densely gray-puberulent; leaf-blades thin-chartaceous, uniformly gray-green on both surfaces, elliptic, 8—20 mm. long, 3—8 mm. wide, mostly obtuse or subacute at the apex, sometimes obscurely 3-denticulate or emarginate, otherwise entire, acute at the base, densely gray-puberulent on both surfaces, the venation rather inconspicuous; inflorescence spicate, axillary, the spikes abbreviated, 1—2 cm. long in fruit, densely fruited, conspicuously bracteate and extremely hirsute in fruit; bracts elliptic, about 4 mm. long and 1—1.5 mm. wide, densely gray-puberulent on both surfaces like the leaves, obtuse or subacute at the apex, projecting beyond the fruits and conspicuous; fruiting-calyx densely long-hirsute with wide-spreading shiny silvery hairs which are longer than the fruit-body itself.

The type of this distinctive species was collected by Marshall C. Johnston (no. 2712) in desert scrub on a sandy loam flat by a shallow wash 31.1 miles south of Hermosillo, Sonora, Mexico, on August 2, 1955, and is deposited in the herbarium of the University of Michigan.

LANTANA MEARNSII var. PUNCTATA Moldenke, var. nov.

Haec varietas a forma typica speciei laminis foliorum subtus dense resinoso-punctatis recedit.

This variety differs from the typical form of the species in having its leaf-blades densely resinous-punctate beneath. The leaf-blades are also more elongate-lanceolate, to 10 cm. long and to 3.7

cm. wide, thinner in texture, and not matted-tomentose beneath.

The type of the variety was collected by Leonard John Brass (no. 17719) occasional in rainforest regrowths, at 1200 meters altitude, on Cholo Mountain, Cholo district, Nyasaland, on September 21, 1946, and is deposited in the Britton Herbarium at the New York Botanical Garden.

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# MATERIALS TOWARD A MONOGRAPH OF THE GENUS LIPPIA. VII

Harold N. Moldenke

LIPPIA PUMILA Cham.

Additional bibliography: Moldenke, Lilloa 5: 429. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Phytologia 2: 385. 1947; Moldenke, Lilloa 14: 46. 1948; Moldenke, Alph. List Cit. 2: 368, 370, 552, & 553 (1948), 3: 695, 848, & 921 (1949), and 4: 1250 & 1300. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Phytologia 3: 74. 1949; Stellfeld, Trib. Farmac. 19 (10): 169. 1951; Angely, Fl. Paran. 7: 12. 1957; Moldenke, Résumé 94 & 462. 1959; Angely, Fl. Paran. 16: 60 (1960) and 17: 46. 1961; Moldenke, Phytologia 12: 24, 90, & 221. 1965.

Perennial herb, viscid-pubescent and softly villosulous-hirtellous throughout; rhizome creeping, woody; stems herbaceous, simple, erect, rather terete, about 20 cm. tall; leaves decussate-opposite or ternate, sessile, ovate or elliptic, crenate-serrate along the margins from the middle to the apex, venose, the lowest ones smallest, the following ones larger and mostly obtuse at the apex, the upper ones perfectly formed, about 1.8 cm. long and 1 cm. wide, acute at the apex; inflorescences in the upper leaf-axils; peduncles solitary, filiform, erect, twice as long as the leaves; heads hemispheric, many-flowered, 1 cm. wide; bractlets lanceolate, acute at the apex, very smooth on the inner surface, equaling the corolla-tube, those of the involucre slightly larger; corolla hypocrateriform, yellow, about 4 mm. long, pubescent on the outside, villosulous toward the throat inside, the limb rather large, oblique, shiny, the lobes obtuse at the apex, the lateral ones retuse at the apex.

The type of this species was collected by Friedrich Sellow somewhere "In Brasilia meridionali" and is deposited in the herbarium of the Naturhistorisches Museum at Vienna, where it was photographed by Macbride as his type photograph number 34332. Schauer (1847) places the species in his Section Zapania, Subsection Axilliflorae. It has been found growing on campos, sandy and burned-over campos, at 875 meters altitude, flowering in March, August, October, and November. Material has been misidentified and distributed in herbaria as L. asperrima Cham. and L. intermedia Cham. On the other hand, the Kuntze s.n. [Std Paraguay, IX.92], distributed

as L. pumila, is L. tegulifera Briq. The Bahia record given for L. pumila by me in previous publications was based on Hertel 6, but this collection proves to have come from Vila Velha in Paraná, not from Bahia.

In all, 9 herbarium specimens and 9 mounted photographs, including phototype material, have been examined by me.

Citations: BRAZIL: Matto Grosso: Hoehne & Gehrt s.n. [Campo Grande, Aug. 6, 1936] (Sp—35785, Sp). Paraná: Dusén 16736 (F—photo, N—photo, S, Si—photo, Z—photo), s.n. [Vila Velha, 13.3. 1904] (S), s.n. [Desvio Ribas, 15.3.1904] (S); Hertel 6 [Herb. Jard. Bot. Rio de Jan. 50530] (N); F. C. Hoehne s.n. [Vila Velha, Ponta Grossa, Nov. 3, 1928] (N, Sp—23346). State undetermined: Reinhardt s.n. (Cp, N—photo, Z—photo); Sellow s.n. [Macbride photos 34332] (It—photo of tupe, Kr—photo of type, N—photo of type).

LIPPIA RADULA J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 279. 1900.

Synonymy: Lippia rodula Baker ex Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 791, sphalm. 1962.

Bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 279. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 50 & 96. 1942; Moldenke, Phytologia 2: 482. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 110, 118, & 190. 1949; Moldenke, Résumé 135, 146, & 462. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 791. 1962; Moldenke, Phytologia 12: 42, 106, 177, 230, 307, & 352. 1965; Moldenke, Résumé Suppl. 12: 5, 6, & 10. 1965.

Undershrub, 1 or more m. tall; stems stout, short-pubescent, not branched below the inflorescence; leaves ternate, sessile, oblong, distinctly crenate along the margins, rigidly coriaceous, very scabrous on the upper surface, densely pubescent, the lower ones 7.5—10 cm. long and 4—5 cm. wide, the venation prominent beneath; heads oblong or ovate, about 1.5 cm. long, a few aggregate at the ends of long stiff ascending peduncles, forming an ample terminal panicle; bractlets closely imbricate, orbicular, very hairy, not cuspidate at the apex, the outer ones about 4 mm. wide; flowers scarcely surpassing the bractlets.

The type of this species was collected by Georg August Schweinfurth (no. 2616) on the Sabbi River, in the Bongo region, Kenya, on November 24, 1869. The species is known thus far to me only from the type collection. The specific name is often uppercased. Material has been misidentified and distributed in herbaria as Lantana sp. On the other hand, the E. Brown 84, distributed as L. radula, is actually L. grandifolia Hochst. The record of this species from Abyssinia by me in previous publications is an error. It is not known as yet from outside of Kenya.

Baker (1900) separates the 8 tropical African species known to him as follows:

1. Bractlets orbicular, obtuse at the apex.

2. Peduncles very short.....L. oatesii.
2a. Peduncles elongate.....L. radula.
1a. Bractlets cuspidate at the apex.
3. Leaves small.
4. Leaves orbicular to obovate.....L. somalensis.
4a. Leaves oblong, rugosa.....L. javanica.
3a. Leaves larger, oblong or oblanceolate-oblong, scarcely rugose.....L. abyssinica.
1b. Bractlets acuminate.
5. Leaves opposite.....L. ukambensis.
5a. Leaves ternate.....L. burtonii.
1c. Bractlets acute at the apex.....L. plicata.

In all, 2 herbarium specimens and 4 mounted photographs of the type collection have been examined by me.

Citations: KENYA: Schweinfurth 2616 (F--photo of isotype, N--isotype, N--photo of isotype, S--isotype, Si--photo of isotype, Z--photo of isotype).

LIPPIA RAMBOI Moldenke, Lloydia 13: 223--224. 1950.

Bibliography: Moldenke, Lloydia 13: 223--224. 1950; Moldenke, Phytologia 3: 376. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Inform. Mold. Set 48 Spec. [3]. 1954; Rambo, Sellowia 7: 260, 281, & 288. 1956; Moldenke, Résumé 94 & 462. 1959.

Virgate or divaricately branched shrub, to 3 m. tall; branchlets and twigs slender, stramineous, obtusely tetragonal, strigillose on two opposite sides, glabrate on the two other sides; nodes annulate; principal internodes 2.5--5 cm. long; leaves decussate-opposite; petioles slender, 2--4 mm. long, glabrous; leaf-blades firmly chartaceous, grayish-green above, lighter beneath, elliptic or elliptic-obovate, acute at the apex, cuneate-attenuate or acuminate at the base, serrate from about the middle to the apex, pilosulous-scabrellous with bulbous-based hairs above, subglabrous but densely punctate beneath, occasionally with a few scattered short white hairs on the venation; midrib slender, subimpressed above, sharply prominent beneath; secondaries very slender, 2--5 per side, subimpressed above, sharply prominent beneath; veinlet reticulation indiscernible above or the largest parts subimpressed, plainly visible but not at all elevated beneath; inflorescence axillary, subcapitate-spicate, 2 per node, abundant, shorter than the subtending leaves; peduncles rather stoutish, tetragonal-angular, 13--20 mm. long, subglabrate or minutely puberulous on 2 opposite sides; spikes very densely subcapitate, to 1 cm. long and 1.5 cm. wide; bractlets large, foliaceous, conspicuous, the lowest ones elliptic, to 8 mm. long and 4 mm. wide, firmly chartaceous, obtuse at the apex, strigillose-scabrellous above and punctate beneath like the leaves, the upper ones smaller and more conspicuously appressed-strigillose on the back; calyx about 2.8 mm. long, densely hirsutulous-pubescent, plainly lobed; corolla about 5 mm. long, densely strigose on the outside, its limb very short.

The type of this distinctive species was collected by my good

friend and colleague, Padre Balduin Rambo (no. 46306) — in whose honor it was named — in an Araucaria grove at São Francisco de Paulo, Rio Grande do Sul, Brazil, on March 13, 1950, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collector states that it seems to be a very rare species in Rio Grande do Sul. It was also collected by Padre Buck (no. 11569) at Fazenda Englert near the type locality in January, 1944, the specimen deposited in the herbarium of the Colegio Anchieta at Porto Alegre. This type locality should not be confused with that of the same name on Sellow's labels, which is actually the modern Pelotas near the southeast coast of Rio Grande do Sul. It is on the southern border of the southern Brazilian highlands, 900 meters above sealevel and 120 km. north-northeast of Porto Alegre, about 29° S. latitude and 51° W. longitude. The locality of 11569 is about 50 km. away from São Francisco to the northeast. The range of the species seems to be confined to Araucaria forests with 14—16° middle temperature, 1750—2000 mm. rainfall, and occasional snowfall in July and August.

In all, 12 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Rio Grande do Sul: Rambo 46306 (N—type, S—isotype), 52156 (B, B, Le, Le, N, S, W—2102353, Z), 54583 (B); Sehnem 5870 (B).

LIPPIA RECOLLETAE Morong in Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 196—197. 1892.

Synonymy: Lippia recollectae Morong apud Chod., Bull. Herb. Boiss., sér. 2, 2: 820, sphalm. 1902. Lippia recollectae var. balansae Chod., Bull. Herb. Boiss., sér. 2, 2: 820. 1902. Lippia recoletae Morong apud Briq., Arkiv. Bot. Stockh. 2 (10): 19, sphalm. 1904. Lippia recolletae var. balansae Chod. ex Moldenke, Résumé 117 & 462. 1959.

Bibliography: Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 196—197. 1892; Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Chod., Pl. Hassler. 1 (9): 199. 1902; Chod., Bull. Herb. Boiss., sér. 2, 2: 820. 1902; Durand & Jacks., Ind. Kew. Suppl. 1: 250. 1903; Briq., Arkiv Bot. Stockh. 2 (10): 19. 1904; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 315—316. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 492. 1904; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1156. 1904; Moldenke, Alph. List Common Names 20. 1939; Moldenke, Lilloa 5: 425—426. 1940; Moldenke, Suppl. List Invalid Names 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41, 43, & 96. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Phytologia 2: 78 & 107. 1945; Moldenke, Lilloa 11: 206. 1945; Moldenke, Alph. List Cit. 1: 12, 262, & 266. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 15. 1947; Moldenke, Alph. List Cit. 2: 440, 441, 444, 600, & 628. 1948; Moldenke, Castanea 13: 118. 1948; Moldenke, Lilloa 14: 44—45. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99, 105, & 190. 1949; Moldenke, Alph. List Cit. 3: 665, 666, 705, 749, 772,

781, & 865 (1949) and 4: 1237 & 1257. 1949; Moldenke, Phytologia 3: 289. 1950; Moldenke, Résumé 117, 125, 316, & 462. 1959; Moldenke, Résumé Suppl. 3: 33 (1962) and 12: 5. 1965; Moldenke, Phytologia 12: 63, 90, 233, & 297. 1965.

A perennial herb, suffruticose, or a subshrub or small shrub, to 0.6 m. tall, with a woody enlarged tuberous taproot; stems nearly simple or with 1 or 2 long branches from near the base, terete below, tetragonal and deeply grooved above, densely papillose-hispid, 3--6 dm. tall, arising from thick ligneous roots; leaves decussate-opposite, petiolate, with a rank odor; petioles 5--15 mm. long; leaf-blades ovate or lanceolate-ovate, 3--7 cm. long, 1.5--2.5 cm. wide, acute or obtuse at the apex, strongly crenate-serrate along the margins, attenuate into the petiole at the base, densely hispid on both surfaces, scarcely penninerved, the secondaries about 7 per side; peduncles 3--5 mm. long, hispid; flowers in dense globular or ovate heads, the heads axillary, solitary; bractlets imbricate, about 4 mm. long, 2--3 mm. wide, cuspidate-acuminate at the apex, densely hirsute-ciliate and hispid, nearly hiding the flowers; calyx membranous, compressed, bifid, puberulent, splitting and falling off with the seeds at maturity; corolla hypocrateriform, varying from yellow or pale-yellow to cream-white or white, sometimes white with a yellow throat, ampliate, 2-lipped, the upper lip entire, the lower lip 3-lobed, downy on either side under the lobes, about 3 mm. long, only the lobes showing under the acumen of the subtending bractlets; seeds flattened-globose, about 1.5 mm. long, pubescent, splitting at maturity into two hemispheric nutlets.

The type of this very distinct species was collected by Thomas Morong (no. 62) in the neighborhood of Recolleta, a well-known cemetery about two miles from Asuncion, Paraguay, where the collector states that the species abounds. He says that the plant has a strong mint-like odor and flowers in October and November. It is obviously rather closely related to L. suffruticosa (Griseb.) Kuntze.

The original description of the species is sometimes cited as "Morong Enum. pl. coll. Parag. 196" or "Morong, Paraguay (1892) 196" and dated "1893". The species has been found growing in shrubbery, grasslands, and pastures with Solidago, etc., on hard exposed or sandy soil, high campos, in open dry pastures, and along roadsides, flowering in March, April, and from June to December, fruiting in March, August, and December. Jürgensen calls it "very common in the campo" and "abundant" in Paraguay. A vernacular name recorded for it is "malvena".

The flowers are described as "yellow" on Ibarrola 3551, Jürgensen 3776, Kuntze s.n., & Pedersen 4347, as "white" on Malme s.n. & Rodríguez 234, as "white with yellow throat" on Archer 4667 and Lindman A.2313, as "cream-white" on Herb. Hicken 190, Herb. Osten 7536, and T. Rojas s.n., and as "pale-yellow" on Herb. Osten 22238 and Jürgensen 3776.

Material has been misidentified and distributed in herbaria un-

der the names L. asperifolia Rich., L. geminata H.B.K., L. morongii Britton, and L. suffruticosa (Griseb.) Kuntze. On the other hand, the Herb. Osten 11918 and Jörgensen 2631, distributed as L. recolletae, are actually L. asperrima Cham.

Briquet (1904) cites Hassler 1041 from "L'Assomption, dans les champs incultés, avril 1874, fleurs d'un blanc jaunâtre" and 1041a from "Caaguazu, dans les campos, 12 novembre 1874", commenting that "Le n. 1041 est distingué par M. Chodat.....comme var. Balansae, en suggérant subitativement qu'elle pourrait constituer une espèce nouvelle. Nous ne pouvons voir dans ce numéro qu'un échantillon un peu plus robuste, à feuilles un peu plus grandes et plus fortement dentées. Les plus grandes feuilles du n. 1041 ont un limbe qui mesure 7.4 cm. de surface, celles du 1041a bis atteignent 9.5 cm. Ces différences, d'ailleurs purement qualitatives, sont certainement d'ordre individuel."

In all, 52 herbarium specimens, including type material of most of the names involved, have been examined by me.

Citations: BOLIVIA: Cochabamba: Adolfo "D" (Z). PARAGUAY: C. Alvarez s.n. [Asuncion, 1954] (Je—8717); Andeer s.n. (W—2383969); Archer 4667 (N, W—1705490); Hassler 944 (N), 11040 (N), 11583 (Ca—930200, N, S, W—1056988); Hauthal 29 (N); Jörgensen 3776 [Herb. Osten 22238] (Du—197834, N, S, Ug, W—1483918), s.n. [Herb. Mus. Argent. Cienc. Nat. 28/2068] (N); Kuntze s.n. [Std-Paraguay, IX.92] (N, W—701018); Lindman A.2219 1/2 (S), A.2313 (S), A.3903 (N, S); Malme s.n. [Asuncion, July 17, 1893] (S); Morong 62 (Mi—isotype, W—1322974—isotype); Osten 9012 (S, Ug); Edw. Palmer s.n. [1853—6] (W—41092); Pedersen 4347 (N, S, W—2283782); D. Rodriguez s.n. [Herb. Mus. Argent. Cienc. Nat. 23837] (N); T. Rojas s.n. [San Bernardino, June 1915; Herb. Hicken 190; Herb. Osten 7536] (Ug); Wunderli 40 (Pm). ARGENTINA: Corrientes: Ibarrola 3551 (N, S); Pedersen 1163 (W—2141500). Misiones: Bertoni 2552 (N); Ekman 2007 (Mi, N, S), 2008 (N, S); Grüner 597 [Herb. Osten 23175] (Ug); Montes 1979 (N); Niederlein 1476 [Herb. Mus. Nac. Hist. Nat. Buenos Aires 23601] (Ra); D. Rodriguez 234 [Herb. Inst. Miguel Lillo 32056] (Ca—3492, N, W—1802575, W—1858272).

LIPPIA REHMANNI H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5 (1): 196—197. 1901.

Synonymy: Lippia bazeiana H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5 (1): 197. 1901. Lantana bazeiana H. H. W. Pearson ex Moldenke, Alph. List Invalid Names 28, in syn. 1942. Lantana rehmanni H. H. W. Pearson ex Moldenke, Alph. List Invalid Names 28, in syn. 1942. Lippia rehmannii H. H. W. Pearson ex Moldenke, Résumé 316, in syn. 1959. Lippia baurii H. H. W. Pearson ex Moldenke, Résumé Suppl. 12: 10, in syn. 1965.

Bibliography: H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5 (1): 196—197. 1901; A. W. Hill, Ind. Kew. Suppl. 6: 117. 1926; Molden-

ke, Known Geogr. Distrib. Verbenac., [ed. 1], 52, 95, & 96. 1942; Moldenke, Alph. List Invalid Names 28 & 29. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 78. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 122, 189, & 190. 1949; Moldenke, Phytologia 3: 456 & 458 (1951) and 5: 26. 1954; Barton & de Mayo, Journ. Chem. Soc. Lond. 1954 (3): 887—900. 1954; Specter, Handb. Biolog. Data 432. 1956; Moldenke, Inform. Mold. Set 51 Spec. 3. 1956; Barton & de Mayo, Biol. Abstr. 30: 4066. 1956; Moldenke, Résumé 142, 152, 154, 303, 307, 310, 316, & 462. 1959; Kingsbury, Poison. Pl. 295 & 610. 1964; Moldenke, Phytologia 12: 231, 232, & 358. 1965; Moldenke, Résumé Suppl. 12: 10. 1965.

Herb, low undershrub, or small erect shrub, 0.5—1.1 m. tall, much branched from the base and above; adult stems tetragonal or terete, striate, scabrid-puberulent or scabrid-pubescent to pubescent, with rounded angles, often glandulose; principal internodes 2.5—5 cm. long; leaves decussate-opposite, sessile or short-petiolate; leaf-blades ovate or elliptic, 2.5—5.5 cm. long, 1—2.5 cm. wide, acute or obtuse at the apex, cuneate at the base, with crenate-serrate or coarsely serrate slightly recurved margins, rugose or slightly so, scabrid or scabrid-pubescent above and on the venation beneath, glandular-punctate; secondaries 4 or 5 per side, ascending, impressed above, prominent beneath; peduncles terete for the lower 3/4, dilated and tetragonal above, or angular and 4-grooved, 0.8—5 cm. long, scabrid-puberulous or pubescent; spikes globose to cylindric or ovoid-cylindric in fruit, solitary, with a pubescent rachis, to 1.6 cm. long and 6—8 mm. wide; bractlets broadly ovate or ovate to obovate, subacuminate or shortly acuminate to caudate-acuminate at the apex, 3—6 mm. long, 2 mm. wide, equaling or slightly surpassing the flowers, 3-veined, densely pubescent and often profusely glandulose; calyx compressed, 1—2 mm. long, distinctly veined, densely pubescent or appressed-pubescent outside, glabrous within, the rim subtruncate or subbilobed with 2 very short rounded lobes; corolla hypocrateriform, white or cream-colored, pubescent outside, puberulent within or pubescent only above the middle within, its tube 3—4 mm. long, 1—1.25 mm. wide, hairy above, the anterior lobe broad, entire or subemarginate, the posterior one sinuate, smaller than the anterior one, the middle lobe of the lower lip 1 mm. wide; stamens in 2 series; anthers 0.5 mm. long; style 1—1.25 mm. long or the ovary and style together about 2 mm. long; ovary glabrous; seeds semiglobose, shortly oblong, or shortly obovoid, plano-convex, flattened at the commissure, 1—1.5 mm. long, 0.5—1 mm. wide, glabrous, smooth.

The type of this species was collected by A. Rehmann (no. 4259) in the hills above the Aapies River, Transvaal, South Africa. The type of L. bazeiana and of L. baurii was collected by Rev. Leopold Richard Baur (no. 462) at Bazeia, at an altitude of 2000 feet, Tembuland, Cape of Good Hope, South Africa. The leaves contain an essential oil which smells of limonene. The plant also produces icterogenin, $C_{34}H_{52}O_6$, a photodynamic agent with a toxic photosensitization effect, causing "yellow thick head" in sheep.

Meeuse 9414 is said to represent a shade form of the species.

The species has been found growing on rocky hillsides, in dry Acacia sand veld, in undergrowth of mixed bush, and especially along roadsides, flowering in January, April, and December, and fruiting in April.

Pearson (1901) distinguishes this species from related South African species as follows:

1. Calyx distinctly 2-lobed.
   2. Bractlets more than 4 mm. long and 3 mm. wide, surpassing the flowers.....L. scaberrima.
   2a. Bractlets less than 4 mm. long and 3 mm. wide, not surpassing the flowers.....L. javanica.

1a. Calyx truncate, subtruncate, or obscurely lobed.
   3. Leaf-blades serrate or crenate-serrate.
      4. Bractlets more than 4 mm. long; calyx truncate or obscurely 4-toothed.....L. wilmsii.
      4a. Bractlets less than 4 mm. long; calyx obscurely 2-lobed.....L. rehmanni.
   3a. Leaf-blades crenate.....L. pretoriensis.

Meeuse, in a letter to me, dated September 28, 1953, says: "The family Verbenaceae does not seem to offer many difficulties apart from the genus Lippia. I am inclined to believe that Pearson's L. rehmannii, L. wilmsii, L. bazeiana and L. pretoriensis can hardly be different from 'L. asperifolia'(=L. javanica)." In a letter dated December 9, 1953, he says "The Lippia material is extremely variable and some of Pearson's species definitely must be sunk. His calyx-character (distinctly lobed or indistinctly lobed to truncate) is useless, to my mind, so that L. wilmsii cannot on very good grounds be separated from L. scaberrima, and the three L. rehmannii-bazeiana-pretoriensis are also very close." The H. Lang s.n. [Herb. Transvaal Mus. 32208], distributed as L. rehmanni, is actually L. wilmsii H. H. W. Pearson.

In all, 17 herbarium specimens, including type material of all the names involved, and 3 mounted photographs have been examined by me.

Citations: CONGO LEOPOLDVILLE: Bredo 5576 (Br, N). SWAZILAND: M. Stewart s.n. [Herb. Transvaal Mus. 8963] (Af). SOUTH AFRICA: Cape of Good Hope: Baur 462 (Af, N--photo, N--photo). Transvaal: Chippindall 137 (Af); L. E. Codd 1132 (Ss); T. J. Jenkins s.n. [Herb. Transvaal Mus. 6758] (Af); Meeuse 9414 (Ss), 9543 (Ss); Mes s.n. [X.1917] (N); Rehmann 4259 (Af--isotype, N--photo of isotype); Schweickerdt 1096 (Af, Z), 1222 (S), 1299 (S); I. C. Verdoorn 579 (Af); Wasserfall & Niekerk 15, in part (Af).

LIPPIA RETICULATA Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906.

Bibliography: Hayek in Fedde, Repert. Nov. Sp. 2: 87. 1906; Prain, Ind. Kew. Suppl. 4: 142. 1913; A. B. Seymour, Host Ind. Fungi N. Am. 588. 1929; Moldenke, Known Geogr. Distrib. Verbenac.,

[ed. 1], 37 & 96. 1942; Moldenke, Alph. List Cit. 1: 223 (1946) and 3: 693. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Résumé 94 & 462. 1959; Moldenke, Phytologia 12: 153, 200, & 274. 1965.

Branchlets elongate, ferruginous, velutinous with very short spreading hairs, finally glabrate; leaves decussate-opposite, sessile, ovate-orbicular, 1.5--3 cm. long, subacute or obtuse at the apex, broadly cuneate or truncate at the base, often shorter than the internodes,dentate along the margins, almost plane above or with the veins slightly impressed, smooth and slightly glandular-pilose beneath, the venation reticulate and glandular-velutinous; peduncles axillary, solitary in the axils of the uppermost leaves at the apex of the branchlets, subequaling the subtending leaves; heads ovate, 1.5--2 cm. long; bractlets 6--7 mm. long, almost orbicular, membranous, with elevated veins, hirsute; corolla hypocrateriform, scarcely surpassing the subtending bractlet, hirsute.

This little-known species was based by Hayek on two collections made by George Gardner under the number 2940, one from Piauí and the other from Pernambuco, Brazil, the former photographed by Macbride in the Delessert Herbarium at Geneva as his type photograph number 24664. Hayek (1906) says: "Differt a L. elliptica Schauer foliis multo minoribus latioribusque indumento alieno, capitulis minoribus brevius petiolatis bracteis hirsutis, a L. hederifolia Mart. foliis subtus reticulato-nervosis pilosis bracteis hirsutis, a L. marrubiifolia Reichardt foliis supra non velutinis dentatis nec crenatis capitulis minoribus bracteisque hirsutis."

Seymour (1929) reports that this species is infested by the fungi Cladosporium herbarium (P.) ex Lk. and Sphaerella lippiae Fragoso & Ciferri. The species is known only from the type collections. Material has been misidentified and distributed in herbaria as Lantana sp.

In all, 4 mounted photographs of type material have been examined by me.

Citations: BRAZIL: Piauf: G. Gardner 2940 [Macbride photos 24664] (It--photo of cotype, Kr--photo of cotype, N--photo of cotype, W--photo of cotype).

LIPPIA RHODOCNEMIS Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 592. 1847.

Synonymy: Lippia rhodocnensis Mart. & Schau. ex Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151, sphalm. 1895. Lippia rhodocnemis Cham. ex Moldenke, Résumé Suppl. 3: 33, in syn. 1962. Lippia rhodocnenis Mart. & Schau. ex Moldenke, Résumé Suppl. 12: 11, in syn. 1965.

Bibliography: Schau. in A. DC., Prodr. 11: 592. 1847; Schau. in Mart., Fl. Bras. 9: 249 & 307, pl. 40. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Massart & al., Mission Belg. Brésil 1922-23 1: fig. 431. 1929; Stapf, Ind. Lond. 4: 125. 1930; Worsdell, Ind. Lond. Suppl. 2: 58. 1941; Moldenke, Known Geogr.

Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Cit. 2: 558 (1948) and 3: 691 & 710. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Résumé 94 & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 3: 33 (1962), 8: 5 (1964), and 12: 11. 1965; Moldenke, Phytologia 12: 24. 1965.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 40. 1851; Massart & al., Mission Belg. Brésil 1922-23 1: fig. 431. 1929.

Shrub, 1--1.5 m. tall, branched, tomentose throughout with hirtous and glanduliferous hairs intermixed; leaves decussate-opposite or approximate, fragrant, spreading, short-petiolate, variable in size and shape; petioles about 6 mm. long; leaf-blades ovate-elliptic or lanceolate, 1.5--6 cm. long, 1--4 cm. wide, subacute or obtuse at the apex, crenate along the margins, pennineryed, rugose-venose above, subcanescent beneath, sometimes subovate with a rounded base, sometimes oblong or lanceolate with an acuminate base, marked with shiny sessile glands beneath the tomentum on the lower surface; peduncles axillary, solitary, 1.5--2.5 cm. long, shorter than the subtending leaves; heads about the size of a cherry (Prunus cerasus L.); bractlets subherbaceous-membranous during anthesis, more or less colored, ovate, 6--8 mm. long, subequaling the corollas, subacuminate at the apex, many-veined and reticulate, glandulose, hirsutulous, somewhat enlarged after anthesis to 1.2 cm. and then thin, pellucid, and conspicuously reticulate; calyx about 2 mm. long, hirtous, bifid, acutely 4-dentate; corolla hypocrateriform, violet or rose, about 8 mm. long, villosulous on the outside, its tube somewhat incurved, ventricose-ampliate above, sparsely villous within, the limb small, the lobes rounded, the lowest one enlarged, the rest smaller; stamens and pistil typical of the genus; fruit subclavate-obcordate; seeds equal.

This distinct species is based on a collection made by Carl Friedrich Philipp von Martius (no. 1474) at Chapada, and one made by Johann Emanuel Pohl in the Serra dos Pinheiros, Minas Geraís, Brazil, deposited in the herbarium of the Botanische Staatssammlung at Munich and the Naturhistorisches Museum at Vienna. Schauer (1847) places it in his Subsection B of Section Rhodolippia. It apparently grows on campos, flowering in May and June. Schauer describes the flowers as "rose", but Mendes Magalhaes 1815 had them "violet". The Holway & Holway 406 collection is infested with the fungus Puccinia lantanae Farl. The Holway & Holway 1006, distributed as L. rhodocnemis, is actually Lantana hypoleuca Briq., Pickel 2319 is Lantana radula Sw., and Pohl 809 is not verbenaceous.

In all, 4 herbarium specimens and 4 mounted photographs, including photographs of cotype material, have been examined by me.

Citations: BRAZIL: Minas Geraís: Martius 1474 [Macbride photos 20331] (It--photo of cotype, Kr--photo of cotype, N--photo of cotype, W--photo of cotype); Mendes Magalhaes 1815 [Herb. Jard. Bot. Belo Horiz. 41747] (Be--13949, N, N). Rio de Janeiro: Holway &

Holway 406 (N).

LIPPIA RIEDELIANA Schau. in A. DC., Prodr. 11: 582. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 582. 1847; Schau. in Mart., Fl. Bras. 9: 234. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Hayek, Denkschr. Kaiser. Akad. Wissen. Math.-nat. 79 (1): 296. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 78. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Phytologia 3: 305. 1950; Moldenke, Résumé 94 & 462. 1959; Moldenke, Phytologia 12: 24. 1965.

Strigose-hirtellous and subviscid throughout; branches 15--22 cm. long, apparently issuing from a creeping rhizome, many, erect, woody at the base, subterete; leaves small, decussate-opposite, rather crowded, sessile, ovate, subacute at the apex, rounded at the base, crenate and revolute along the margins except at the entire base, patulous, rugose-venose, the venation pinnate, impressed above, prominulent and hirtellous beneath, with sessile glands in the areoles beneath; peduncles solitary in the upper axils, filiform, exserted, twice or more times as long as the subtending leaves; heads hemispheric, rather large, about 1.2 cm. wide, loosely imbricate, terminal on the peduncles; bractlets herbaceous, broadly ovate, 4 mm. wide at the base, very shortly acuminate at the apex, shorter than the corolla-tube, strigose-pubescent on both surfaces, long-ciliate on the subreflexed margins, 3--5-veined on the back and pulverulent-glandulose with scattered sessile glands among the pubescence; calyx obovate, compressed, 2 mm. long, villosulous and pulverulent-glandulose, very shortly bifid, the segments 2-toothed; corolla purple, rather large, exserted, subvillous outside and with shiny resinous glands, its tube 6 mm. long, slightly incurved, slightly ampliate above, the limb with the upper lip emarginate, the lower lip with its middle lobe subretuse and the lateral ones ovate and obtuse.

The type of this little-known species was collected by Ludwig Riedel -- in whose honor it is named -- in sandy and gravelly places near Tejuco, Minas Gerais, Brazil, flowering in December, and is deposited in the herbarium at Leningrad. Schauer (1847) places it in his Section Zapania, Subsection Axilliflorae, and (1851) says of it "Habitus quodammodo L. pumilae a qua vero capitulis floribusque majoribus bracteisque latis facile discriminatur." Hayek (1908) cites Wettstein & Schiffner s.n. from "Circa Parnahyba ad fl. Tieté, ca. 700 m. s. m., V. 1901", São Paulo. I know nothing whatever of this species except what is given in the literature.

LIPPIA RIGIDA Schau. in A. DC., Prodr. 11: 577. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 577. 1847; Schau. in Mart., Fl. Bras. 9: 228. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-78: 97. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96 (1942) and [ed. 2], 81 & 190. 1949; Moldenke, Alph. List Cit. 3: 691 & 712. 1949; Moldenke, Résumé 94 & 462. 1959; Moldenke, Phyto-

logia 12: 23. 1965.

Much-branched rather rigid shrub, hirtellous throughout; branches and branchlets dehse, rather rigid, subterete, leafy, pubescent-hirtellous, subincanous; leaves small, decussate-opposite or ternate, oval or subrotund, 4--8 mm. long and equally as wide, very short-petiolate, obtuse or subacute at the apex, crenate along the margins, very rugose, penninerved, strigose with depressed rigid hairs, incanous-hirsute beneath, often with abbreviated densely leafy twigs in their axils, inflexed, the upper ones gradually smaller; peduncles many, aggregate at the apex of the branchlets, canescent, 8 mm. long, varying from single to paired or quaternate in the axils of the upper leaves, flaccid; heads tetraquetrous-globose or ovoid, exserted, 4--6 mm. long during anthesis, canescent; bractlets pale, broadly ovate, short-acuminate at the apex, imbricate, farinose-glandulose, the keel and margins hirsute, equaling the corolla-tube; calyx 1.5 mm. long, pale, hirsute, loosely investing the base of the corolla-tube, very shortly 4-toothed, finally bifid; corolla small, its tube slightly incurved,somewhat more than 3 mm. long, ventricose above the middle, puberulent and resinous-glandulose, the limb white or yellowish, undulate, inflexed, puberulent and resinous-glandulose on the back, the lobes rounded, the simuses smooth and revolute, the lowest lobe transversely oblong, broadly unguiculate.

The type of this little-known species was collected by Carl Friedrich Philipp von Martius in woods near Maracas, Catingas, Bahia, Brazil, flowering in November, and is deposited in the Martius Herbarium at Munich, where it was photographed by Macbride as his type photograph number 20332. Schauer (1847) places the species in his Section Goniostachyum, and says (1851) of it "Affinis L. microphyllae et glandulosae; ad utraque aspectu rigido, ramulis ad apices tantum floriferis, foliorum bractearumque figura et indumento distincta." Material has been misidentified and distributed in herbaria under the name L. microphylla Cham. & Schlecht. Only 4 mounted photographs of the type have been examined by me.

Citations: BRAZIL: Bahia: Martius s.n. [Macbride photos 20332] (It--photo of type, Kr--photo of type, N--photo of type, W--photo of type).

LIPPIA RODRIGUEZII Moldenke, Lilloa 5: 426. 1940.

Synonymy: Lippia rofriguezii Moldenke, Résumé 316, in syn. 1959.

Bibliography: Moldenke, Lilloa 5: 426. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 43 & 96. 1942; Moldenke, Lilloa 10: 379 (1944) and 14: 45. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 79. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 190. 1949; Moldenke, Alph. List Cit. 2: 441 & 444 (1948), 3: 863 (1949), and 4: 1257. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 126, 316, & 462. 1959; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961.

Dioecious shrub, to 1.4 m. tall; branches slender, erect, obtusely tetragonal, densely appressed-strigose with short, rather

harsh, white hairs; nodes conspicuously annulate; twigs short, very slender, densely spreading-pubescent, the pubescence brown and more or less glandular; leaves decussate-opposite, short-petiolate or subsessile; petioles obsolete or to 5 mm. long (on large leaves) and flattened-ampliate or margined, appressed-strigillose; leaf-blades subcoriaceous, uniformly gray-green on both surfaces when mature, thinner and brunnescent in drying when immature, oblong or narrowly elliptic, 3--5.5 cm. long, 5--10 mm. wide, acute at the apex, regularly serrulate from the middle to the apex with small, acute, appressed, antrorse teeth, acute and attenuate into the petiole at the base, scabrous and densely appressed-strigillose above with harsh antrorse white hairs, more densely strigose-pubescent beneath, the pubescence albidous; midrib, secondaries, and veinlet reticulation deeply impressed above, prominent or prominulous beneath; inflorescence axillary, about equaling the immature subtending leaves or surpassing them, 1.5--3 cm. long; peduncles filiform, 1--2.5 cm. long, densely glandular-pubescent with brown spreading hairs; heads compact, not elongating; bractlets linear, densely strigose-pubescent, brownish; corolla hypocrateriform, yellow or orange.

The type of this species was collected by Demetrio Rodriguez (no. 609) -- in whose honor it was named -- at Santa Ana, Misiones, Argentina, on September 21, 1912, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been found growing in grassy places, flowering in April, September, November, and December. The flowers are said to have been "yellow" on Schulz 1330, 2443, and 2521, but "orange" on his 1465, 1533, and 1882.

In all, 20 herbarium specimens, including the types of both names involved, have been examined by me.

Citations: ARGENTINA: Misiones: Bertoni 2042 (N); Ekman 2005 (Mi, N, S), 2006 (Mi, N, S); D. Rodriguez 609 [Herb. Mus. Argent. Cienc. Nat. 23850] (Ca--3491--isotype, It--isotype, N--type, N--isotype, Ra--isotype, W--1858287--isotype); G. J. Schwarz 1330 (N), 1465 (N), 1533 (N), 1882 (N), 2443 (N, Vi), 2521 (N).

LIPPIA ROSMARINIFOLIA Anderss., Galap. Veg. 198. 1854.

Bibliography: Anderss., Galap. Veg. 198. 1854; Anderss., Vet. Akad. Handl. Stockh. 1853: 198. 1855; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 96. 1942; Moldenke, Phytologia 2: 335 (1947) and 2: 415. 1948; Moldenke, Castanea 13: 116. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 70 & 190. 1949; Moldenke, Alph. List Cit. 3: 950 & 972 (1949) and 4: 1165 & 1223. 1949; Moldenke, Résumé 81 & 462. 1959.

Shrub, 2 m. or more tall; branches strict, virgate, thick, divided, terete, thickened at the nodes; bark dark-grayish; ultimate branchlets obsoletely tetragonal, brunnescent, strigose with very short deflexed-appressed white hairs; leaves decussate-opposite, sessile, brunnescent in drying, narrowly linear, 1.2--2.7 cm. long, 4--6 mm. wide, rather acute at the apex, entire and revolute along

the margins, narrowed toward the base, the venation lineate-impressed above, very much roughened with very short hairs or prickles which are tuberculate-based, very shortly setulose-hispid beneath, the midrib thick, prominent, the lamina cinereous-tomentose; peduncles axillary, tetragonal, about twice as long as the subtending leaves, spreading-erect, somewhat sulcate above, grayish-strigose; heads subglobose or obovate, 20--30-flowered; bractlets many-ranked, imbricate, gray-hispid on the outer surface, the lower ones ovate-cordate, acute at the apex, the upper ones spatulate, 1/3 to 1/2 as long as the flowers, very minutely apiculate at the apex; calyx tubular-campanulate, bilabiate, bicarinate-subcompressed, hispid-pilose especially above, loosely enveloping the mature fruit, the 2 entire segments surpassing the fruit; corolla hypocrateriform, lilac, the tube elongate, glabrous below, campanulate-dilated and gray-hispid above, the lobes of the limb short, suberect, hispid on the outer surface; fruit 1 mm. long, osseous, globose-apiculate, greenish-gray, glabrous, minutely punctulate; cocci 2, splitting apart when mature.

The type of this very distinctive species was collected by Nils Johan Andersson in very dry places in the interior portions of Albemarle, Galapagos Islands, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. He says of it (1854): "Videtur L. stoechadiflorae (ex insulis Caribaeis et America meridionali littorali) quodammodo affinis, cujus tamen folia mucronato-serrata!"

Stewart says of L. rosmarinifolia "occasional bushes on lava beds near sea level [and] at 650 feet, common at 1300--1500 feet", and found it in flower in April, August, September, and November. His no. 3309 has extra large leaves -- to 2.7 cm. long and 6 mm. wide. The Snodgrass & Heller 890, distributed as L. rosmarinifolia, is actually var. stewarti Moldenke.

In all, 16 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: GALAPAGOS ISLANDS: Abingdon: Snodgrass & Heller 827 (Du--9516); A. Stewart 3304 (Gg--31214). Albemarle: N. J. Andersson s.n. (F--photo of type, N--photo of type, S--type, Si--photo of type, Z--photo of type); Snodgrass & Heller 233 (Du--9514); A. Stewart 3305 (Gg--31218), 3306 (Gg--31207), 3308 (Bi, Gg--31210, N, W--921593), 3311 (Bi, Gg--31212, N, W--921594). James: A. Stewart 3309 (Gg--31211). Narborough: A. Stewart s.n. (Gg--31213).

LIPPIA ROSMARINIFOLIA var. STEWARTI Moldenke, Phytologia 2: 415--416. 1948.

Bibliography: Moldenke, Phytologia 2: 415--416. 1948; Moldenke, Castanea 13: 116. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 70 & 190. 1949; Howell, Wasmann Journ. Biol. 10: 377. 1952; Moldenke, Résumé 81 & 462. 1959.

This variety differs from the typical form of the species in having pinnately lobed leaf-blades, the lobes on smaller leaves being tooth-like, divergent, 1--3 per side.

The type of this variety was collected by Alban Stewart (no. 3307) -- in whose honor it was named -- on the sides of a mountain, to 4000 feet altitude, at Tagus Cove, Albemarle, Galapagos Islands, on March 27, 1906, and is deposited in the herbarium of the California Academy of Sciences at San Francisco. It was originally identified and distributed in herbaria as L. rosmarinifolia Anderss. and the taxon is known thus far only from the original collection.

In all, 3 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: GALAPAGOS ISLANDS: Albemarle: A. Stewart 3307 (F--photo of type, Gg--31209--type, N--isotype, N--photo of type, Si--photo of type, W--543207--isotype, Z--photo of type).

LIPPIA ROTUNDIFOLIA Cham., Linnaea 7: 230. 1832.

Synonymy: Lippia vauthieri Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 234. 1900. Lippia rotundifolia Cham. & Schlecht. ex Moldenke, Alph. List Invalid Names Suppl. 1: 15, in syn. 1947.

Bibliography: Cham., Linnaea 7: 230. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 599. 1843; Walp., Repert. Bot. Syst. 4: 52. 1845; Schau. in A. DC., Prodr. 11: 590. 1847; Schau. in Mart., Fl. Bras. 9: 245--246 & 302, pl. 39. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 99. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Schimper, Pflanzen-Geogr. 402. 1898; Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 234. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 496. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 542. 1911; Stapf, Ind. Lond. 4: 125. 1930; Herter, Florul. Urug. 105. 1930; Herter, Revist. Sudam. Bot. 4: 186. 1937; Herter, Beih. Bot. Centralbl. 59: 275. 1939; Moldenke. Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Alph. List Cit. 1: 97, 106, 170, 231, & 238. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 15. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 87. 1948; Moldenke, Lilloa 14: 13. 1948; Moldenke, Alph. List Cit. 2: 367, 369, 484, & 486 (1948), 3: 693, 710, 725, 731, 921, & 922 (1949), and 4: 1072, 1086, 1106, 1203, 1204, & 1300. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Phytologia 4: 70. 1952; Moldenke, Résumé 94, 307, 316, 318, & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 12: 24 & 239. 1965.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 39. 1851; Schimper, Pflanzen-Geogr. 402. 1898.

Perennial suffrutescent herb or subshrub, to 2 m. tall, showy when in flower; stems branched above; floriferous branchlets fastigiate or subfastigiate, corymbose-paniculate, velutinous-tomentose, becoming fuscescent, leafless at the base, confluent with the floriferous ones, the lowest internode elongate; sterile nodes few, approximate; leaves decussate-opposite or subverticillate in 3's or 4's, subequaling the internodes; petioles short; leaf-blades stiffly thick-coriaceous, patulous, subrotund, rather con-

cave, obtuse or very shortly acuminate at the apex, serrate-crenate along the margins, attenuate into the petiole at the base, shiny and very scabrous above, sometimes with short rigid hairs, reticulate-veined and scrobiculate beneath, canescent with velutinous tomentum beneath, sometimes rubiginous, the lowest ones largest, about 5 cm. long and 4 cm. wide, decreasing in size upwards, those beneath the inflorescence smallest; inflorescence subspicate, short-pedunculate, solitary or 2 per leaf-axil, surpassing the subtending leaves, congested at the tips of the branchlets in the form of a compact thyrse; heads many-flowered, at first subcapitate and 1.5 cm. long, elongating during anthesis and finally to 3 cm. long and very lax, nodding; bractlets loosely imbricate, subconcave, membranous, colored, lanceolate, about 8 mm. long, equaling the corolla-tube, long-acuminate at the apex, 5-veined, velutinous, slightly incurved; calyx very short, very hispid, bifid, the lobes very shortly bidentate, finally separating into two halves; corolla hypocrateriform, violet or pink to rose or red, hirtellous on the outside, the tube about 8 mm. long, slightly incurved, ventricose above, the throat yellow and villosulous, the limb rather large, glistening-velutinous, the upper and lateral lobes rounded, the latter half as large, the lowest lobe obovate-truncate, expanded; fruit typical of the genus, obcordate, minute, dark-fuscous, shiny, apiculate at the apex because of a rudimentary style, separating into two parts.

The type of this species was collected by Friedrich Sellow (no. 1440) "ad Parauna el [=et] praedia Junonis et Caroli", Minas Gerais, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, but is now destroyed. The type of L. vauthieri was collected by Vauthier (no. 202) -- in whose honor it is named -- somewhere in Minas Gerais, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where it was photographed by Macbride as his type photograph number 24675.

Schauer (1847) classifies the species in his Section Zapania, Subsection Corymbosae. In his 1851 work he cites also two unnumbered Pohl collections from "ad S. João d'El Rey in rupibus et ad S. João Baptista" and a Riedel s.n. from "in montibus S. João, Junio", Vauthier s.n. from "prope Tejuco", and Lund s.n. from "in campis circa Sabara, Novembri [Kunth, Herb. Br. no. 200]". He also says of this plant "toto habitu insignis, corymbis floridis ornatissimus....Odor spicularum tritartum fortis subcamphoratus, fere Salviae officinalis."

The species has been found growing on campos and flats, and growing among rocks on high campos, at altitudes of 1000 to 1190 meters, flowering from April to September and in November and December, fruiting in September. Mexia describes it as "infrequent". L. B. Smith 7066 shows leaves that are somewhat more acute than usual at the apex. The flowers are described as "pink" on Mexia 5870a, "violet" on Mendes Magalhães 4324, "rose" on Mendes Magalhães 3023 and Macedo 3313, and "red" on Brade 13456.

Material has been misidentified and distributed in herbaria as Hyptis sp. On the other hand, the Glaziou 21896, distributed as L. rotundifolia, is actually L. lacunosa Mart. & Schau.

In all, 41 herbarium specimens, including type material of all the names involved, and 5 mounted photographs have been examined by me.

Citations: BRAZIL: Goías: Macedo 3313 (N, S). Minas Gerais: Brade 13456 [Herb. Rio de Jan. 29537] (B); J. F. de Castro 66 (Sp—31302); P. Clausen 126 [Herb. Martius 1036] (Br, Br, M, S), 260 (Br), 322 (N), 1275 (N), 1398 (W—1706069), s.n. [Aug.—April 1840] (Br, Br); Glaziou 15333 (B, Br), 17160 (Br, Br, C), 17161 (C), 19745 (B); Herb. Rio de Jan. 14857 (Ja); Hoehne & Gehrt s.n. [Turvo] (Sp—17476); A. Lutz 1095 (Z); Macedo 3773 (S, W—2197207); Mello Barreto 3199 [Herb. Jard. Bot. Belo Horiz. 4582] (N), 3202 (Ja—32303); Mendes Magalhães 3023 (Be—14851, W—2124264), 4324 [Herb. Jard. Bot. Belo Horiz. 45131] (N); Mexia 5870a (N, S); Sellow 1440 (N—isotype, N—photo of isotype, Vt—isotype, Z—photo of isotype), s.n. [Brasilia] (Br); L. B. Smith 7066 (W—2124676); Vauthier 202 [Macbride photos 24675] (Kr—photo, N—photo, W—photo); Warming 212 (S), s.n. [Lagoa Santa] (N). State undetermined: Dupré s.n. [Brésil méridional] (N); Labrato 49 (N).

LIPPIA RUBIGINOSA Schau. in A. DC., Prodr. 11: 574—575. 1847.

Synonymy: Lippia rubiginosa α dives Schau. in A. DC., Prodr. 11: 575. 1847. Lippia rubiginosa β pauper Schau. in A. DC., Prodr. 11: 575. 1847. Lippia rubiginosa var. pauper Schau. ex Moldenke, Alph. List Invalid Names Suppl. 1: 15, in syn. 1947. Lippia rubiginosa γ pauperior Schau. ex Moldenke, Alph. List Invalid Names Suppl. 1: 15, in syn. 1947.

Bibliography: Schau. in A. DC., Prodr. 11: 574—575. 1847; Schau. in Mart., Fl. Bras. 9: 223. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 306. 1904; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 15. 1947; Moldenke, Alph. List Cit. 2: 485 (1948), 3: 689 & 920 (1949), and 4: 1015, 1106, & 1156. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 190. 1949; Moldenke, Résumé 94, 316, & 462. 1959; Troncoso, Darwiniana 12: 260. 1961; Moldenke, Phytolgia 7: 334. 1961; Moldenke, Résumé Suppl. 8: 5 (1964) and 12: 4. 1965; Moldenke, Phytologia 12: 23, 47, 96, 152, 170, 310, & 333. 1965.

Shrub; branchlets strict, spreading, tetragonal, cinnamon-colored, abundantly floriferous, scabrous-tomentose; leaves decussate-opposite; petioles about 6 mm. long, densely appressed-pubescent or hirtellous; leaf-blades oblong, acute or obtuse at the apex, crenate-serrulate along the margins, attenuate into the petiole at the base, penninerved, green and lineate- or plicate-rugose above, strigose-puberulent above, greenish- or subferrugineous-

canescent and tomentose beneath with very short hairs, glandulose beneath the indumentum, finally rufescent, the larger ones about 2.5 cm. long and 8 mm. wide, the venation densely appressed-pubescent or hirtellous beneath; peduncles numerous, usually 2 or 4 per axil, filiform, about 1.2 cm. long, flaccid, shorter than the subtending leaves, deflexed or nutant, densely appressed-pubescent or hirtellous; heads at first ovoid, becoming more elongate and cylindric in succession later, 4-quetrous; bractlets membranous, broadly ovate, loosely imbricate, acute at the apex, shorter than the corolla-tube, lightly glandular-pulverulent and puberulent, ciliate on the keel and margins; corolla hypocrateriform, small, white, greenish in drying, the limb undulate-crisped.

This species was proposed by Schauer in 1847 on the basis of two subspecific entities, the first of which may be regarded as being typical of the species proper: (1) dives, with "foliis majoribus simulaque planis, obtusis, subtus inter nervos laterales prominentes venosis pubaque exili tomentosis magisque ferrugineis; pedunculis plerumque quaternisoctonis", based on Sellow 1203 from somewhere in Minas Gerais and a Lund collection made in December "in saxosis ferruginosis" near Ouro Preto, Minas Gerais. (2) pauper, with "foliis minoribus, plicato-rugosis, acutis, nervis subtus approximatis una cum areolis pube hirtella canescentibus; pedunculis plerumque geminis" and based on a Schuch and an Ackermann collection from somewhere in Minas Gerais. Schauer states that his original specimens were deposited in the herbaria at Berlin and Vienna and in the DeCandolle Herbarium at Geneva. The Sellow specimen was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17537, but is now destroyed.

Briquet (1904) compares this species with L. balansae as follows: "Cette espèce [L. balansae] se place tout près du L. rubiginosa.....dont elle se distingué facilement par ses feuilles (ternées) plus grandes, largement ovées, très scabrés (et non strigoso-pubescentes) en dessus, à nervation très réticulée-rugueuse mais assez différente par la disposition des nervures latérales, par ses pédoncules égalant ou dépassant un peu les feuilles (et non pas notablement plus courts), ses bractées dousement pubescentes extérieurement (et non pas à peine puberulentes-glanduleuses et ciliées sur les marges)."

In his 1847 work Schauer places the species in his Section Goniostachyum, but in the 1851 he calls the section Goniolippia. The species has been found in fields, flowering in December and January. Material has been misidentified and distributed in herbaria as L. origanoides H.B.K. On the other hand, the Warming s.n. [Lagoa Santa], distributed as L. rubiginosa, is actually L. elegans Cham. The F. C. Hoehne s.n. [Sta. Barbara, 10-1-1921], cited below, was incorrectly cited by me in Phytologia 12: 152 (1965) under L. elegans.

In all, 6 herbarium specimens and 15 mounted photographs, including phototype material of all the names involved, have been

examined by me.

Citations: BRAZIL: Minas Gerais: Ackermann s.n. [1834] (F--photo, N--photo, Si--photo, Z--photo); F. C. Hoehne s.n. [Sta. Barbara, 10-1-1921] (N, N, Sp--4859); Macedo 2071 (N, S); Sampaio 456 (Ja--14856, Ja); Sellow 1203 [Macbride photos 17537] (It--photo of cotype, Kr--photo of cotype, N--photo of cotype, N--photo of cotype, W--photo of cotype); Ule 2671 (Ja--14894, Ja--31635, Z); s.n. [Herb. Rio de Jan. 31635] (N). São Paulo: Glaziou 16286a (Ja--11108).

LIPPIA RUGOSA A. Chev., Bull. Soc. Bot. France 58, Mém. 8: 191. 1912.

Bibliography: A. Chev., Bull. Soc. Bot. France 58, Mém. 8: 191. 1912; A. Chev., Expl. Bot. Afr. Occid. Franç. 1: 503. 1920; Prain, Ind. Kew. Suppl. 5: 153. 1921; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 46 & 96. 1942; Moldenke, Phytologia 2: 340 (1947) and 2: 482. 1948; Moldenke, Alph. List Cit. 2: 402, 631, 635, & 640 (1948), 3: 675, 750, 759, 768, 817, 877, 894, & 924 (1949), and 4: 996, 1083, 1084, 1093, 1095, 1137, 1164, 1173, 1174, 1177, 1201, 1202, 1209, 1219--1221, 1248, 1260, 1289, 1292, 1298, & 1299. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 111--115 & 191. 1949; Moldenke, Phytologia 3: 136 & 137 (1949) and 3: 291 & 292. 1950; Moldenke, Résumé 136, 138, & 462. 1959; Moldenke, Phytologia 12: 41 & 298. 1965.

A large herb or subshrub, 2--2.5 m. tall; stems 5 or 6 from the same root-crown, bushy, branched at the apex, lightly pubescent on the lower parts; leaves decussate-opposite; petioles about 5 mm. long, scabrous; leaf-blades oblong or lanceolate-oblong, 10--15 cm. long, 3.5--4.5 cm. wide, acute at the apex, crenulate along the margins, very rugose and strongly reticulate-veined; flowers borne in congested heads which form a loose elongate panicle; heads sessile or on peduncles 5--25 cm. long, globose-elongate, 10--12 mm. long, 7--9 mm. wide, rather loose; bractlets oblong, about 4 mm. long, long-acuminate at the apex, pubescent, the acumination itself recurved-hooked at the tip; calyx about 1.5 mm. long, 2-lobed, villous; corolla hypocrateriform, white or cream-colored, yellowish in the throat, shorter than the bractlets.

The type of this species was collected by Auguste Jean Baptiste Chevalier (no. 20410) "dans la grande brousse marécageuse" near Faranah, Tagania, in the Republic of Guinea, on January 12, 1909, and is probably deposited in the herbarium of the Muséum National d'Histoire Naturelle at Paris. The original publication is sometimes given as "A. Chev., Novit. Fl. Afr. 4: 191. 1912". Hutchinson reduces the species to synonymy under what is now known as L. abyssinica (Otto & Dietr.) Cuf.

Lely says "A large herb growing in rock and grass; flowers cream; 6--7 feet tall; very like no. 320 but heads smaller and plant much taller." As yet I have not seen any material of his no. 320. Most of the material cited by me as L. rugosa in my 1948 and

1949 publications proves to be L. multiflora Moldenke or one of the several other taxa in this complex. In all, only 3 herbarium specimens of L. rugosa, including the type collection, and 5 mounted photographs have been examined by me.

Citations: REPUBLIC OF GUINEA: A. Chevalier 20410 (K--isotype). NORTHERN NIGERIA: Lely 582 (F--photo, K, N, N--photo, Sg--photo, Si--photo, Z--photo).

LIPPIA SALAMENSIS Loes., Verh. Bot. Ver. Brand. 53 : 77--78 [Abhandl. 242--243]. 1912.

Bibliography: Loes., Verh. Bot. Ver. Brand. 53: 77--78 [Abhandl. 242--243]. 1912; Prain, Ind. Kew. Suppl. 5: 153. 1921; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 20 & 96 (1942) and [ed. 2], 35 & 191. 1949; Moldenke, Alph. List Cit. 3: 689, 919, & 962 (1949) and 4: 1246. 1949; Moldenke, Résumé 42 & 462. 1959.

Shrub, about 2 m. tall; branchlets obsoletely and obtusely tetragonal, finally subterete, densely pubescent-subsericeous with appressed hairs, the young ones to 3 mm. in diameter; principal internodes 2.5--7 cm. long; leaves decussate-opposite, moderately or long-petiolate; petioles 0.6--3 cm. long; leaf-blades ovate or ovate-elliptic to obovate-elliptic, 7--17 cm. long, 2.8--8.5 cm. wide, membranous or subchartaceous, rounded or obtuse in outline and often very shortly and obsoletely acuminate at the apex, crenulate-serrulate along the margins, cuneate at the base and gradually attenuate into the petiole, pubescent-sericeous or densely pubescent-subsericeous above with appressed hairs, pubescent and glandulose beneath, gray-olivaceous above in drying and paler beneath, smaller to minute in the inflorescences at the apex of the branchlets; midrib and secondaries conspicuous above, prominent or prominulent beneath; veinlet reticulation prominulous near the margins beneath; inflorescence axillary; peduncles mostly about 5 per axil, 9--20 mm. long, more or less pubescent-subsericeous with appressed hairs; heads almost semiglobose during anthesis, about 5 mm. long and 7 mm. wide at the base, ellipsoid and to 10 mm. long and 8--9 mm. wide when in fruit; bractlets subhyaline, reticulate-veined, villosulous-pubescent on both surfaces, ciliolate along the margins, cordiform-deltoid during anthesis and then about 3 mm. long and 5 mm. wide, cordiform-reniform in the fruiting condition and then about 4 mm. long and 8 mm. wide; flowers sweet-smelling when fresh; calyx compressed, about 2.4 mm. long, very hirsute, 2-lobed, the lobes themselves shortly deltoid-bilobulate; corolla whitish when fresh, scarcely surpassing the calyx, the tube ampliate above, puberulent under a handlens on the outer surface, the limb 4-lobed, the anterior lobe scarcely larger than the remainder and apparently eciliate, the others very shortly ciliolate under a handlens; fruit 2-seeded, the seeds easily separable.

This species is based on two collections made by Caecilia and Georg Eduard Seler (nos. 2483 & 3404) in woods by Cuesta Choacruz, dept. Salama, and above Morazán, Baja Verapaz, Guatemala, originally deposited in the herbarium of the Botanisches Museum at Berlin, where the latter was photographed by Macbride as his type

photograph number 17538; both now destroyed. The specific epithet is sometimes written with an uppercase initial letter. Seler & Seler 3404 is sometimes referred to as "Seler 3404". Standley refers to the plant as "common" in damp oak forests at about 1650 meters altitude. It has been collected in anthesis and fruit in November and December.

Loesener (1912) says of this plant: "Die durch die an der Spitze abgerundeten und an der Basis lang keilförmig in den verhältnismässig langen Stiel verschmälerten Blätter höchst characteristische Art dürfte in die Grupp Euzapania gehören und hier eine ziemlich isolierte Stellung einnehmen." He describes the peduncles as 9--20 "cm." long, but this most certainly is an error for "mm."

In all, 5 herbarium specimens, including cotype material, and 6 mounted photographs have been examined by me.

Citations: GUATEMALA: Baja Verapaz: Seler & Seler 3404 [Macbride photos 17538] (Du--283960--cotype, G--cotype, G--photo of cotype, Gg--245893--cotype, Kr--photo of cotype, N--cotype, N--photo of cotype, N--photo of cotype, N--photo of cotype, Z--photo of cotype). Jalapa: P. C. Standley 77462 (N).

LIPPIA SALICIFOLIA Anderss., Galap. Veg. 198--199. 1854.

Bibliography: Anderss., Galap. Veg. 198--199. 1854; Anderss., Vet. Akad. Handl. Stockh. 1853: 198--199. 1855; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34 & 96. 1942; Moldenke, Phytologia 2: 335. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 70 & 191. 1949; Moldenke, Alph. List Cit. 4: 1164. 1949; Moldenke, Résumé 81 & 462. 1959.

Shrub, 2 m. or more in height; branches curving outwards, terete or tetragonal, virgate, thickened at the nodes; branchlets hirsute, appressed strigose-pilose toward the apex; leaves decussate-opposite; petioles very short, canaliculate above; leaf-blades oblong-lanceolate, 6.5--7.5 cm. long, almost 2.5 cm. wide, dark-green, nigrescent in drying, rather obtuse or subrotund at the apex, sharply but not deeply serrate or crenate-serrate and slightly curvate along the margins, cuneate-narrowed and entire at the base, obsoletely scattered-pilose with greatly appressed very short hairs above, very densely incanous-tomentose beneath, the midrib and secondaries regularly impressed above, elevated and hispid beneath; peduncles axillary, spreading or erecto-patent, scarcely 5 cm. long, incrassate, tetragonal, appressed-strigose; heads globose, becoming ovate-elongate after anthesis; bractlets imbricate in many ranks, ovate or broadly cuneate, apiculate at the apex, narrowed at the base, hirtous, half as long as the corolla-tube, subequal, widened at the middle, hispid-hirsute on the outer surface; calyx subglobose, obsoletely bicarinate-compressed when mature, cinereous-hirtous below, glabrescent at the base and on the inner surface, completely and closely enveloping the mature fruit but not surpassing it; corolla-tube twice as long as the calyx, ampliate above, smoothish, the limb deeply parted, the lobes revolute along the margins; fruit globose, about 2 mm. long, apiculate, gla-

brous, the cocci easily separable.

The type of this distinctive species was collected by Nils Johan Andersson (no. 209) in wooded spots on the side of a mountain-top, on Charles Island, Galapagos Islands, in 1852, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. Andersson (1854) says: "Secundum descriptionem cum L. asperifolia valde congruit. Differt autem: pube nullo modo glanduloso, ramulis exacte tetragonis, bracteisque tubo corollae brevioribus." The species is known thus far only from the original collection, of which 4 herbarium specimens, including the type, and 8 mounted photographs have been examined by me.

Citations: GALAPAGOS ISLANDS: Charles: N. J. Andersson 209 (Br—isotype, F—photo of type, F—photo of isotype, N—isotype, N—photo of type, N—photo of isotype, S—type, S—isotype, Si—photo of type, Si—photo of isotype, Z—photo of type, Z—photo of isotype).

LIPPIA SALSA Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 19: 243—244. 1874.

Bibliography: Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 19: 243—244. 1874; Griseb., Pl. Lorentz. 195—196. 1874; Lorentz, Veg. Nordeste Prov. Entre Rios, ed. 1, 150. 1878; Griseb., Abhand. Kaiser. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 279. 1879; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Seckt, Fl. Cordob. 418. 1929—1930; Seckt, Rev. Univ. Nac. Cordoba 17: 90. 1930; Moldenke, Lilloa 5: 427 (1940) and 8: 425. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 43 & 96. 1942; Moldenke, Lilloa 10: 379. 1944; Moldenke, Holmbergia 4: 150. 1945; Moldenke, Alph. List Cit. 1: 16, 96, 162, & 266. 1946; Lorentz, Veg. Nordeste Prov. Entre Rios, ed. 2, 150. 1947; Moldenke, Lilloa 14: 45. 1948; Moldenke, Alph. List Cit. 2: 376, 426, 442, & 537 (1948) and 3: 661, 689, & 746. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2]. 105 & 191. 1949; Moldenke, Phytologia 3: 76. 1949; Moldenke, Alph List Cit. 4: 1062, 1080, 1088. 1090—1092, 1100, & 1172. 1949; Ragonese, Revist. Invest. Agric. 5: 35, 37, 45—52, 54, 57, 59, 61—64, 83, 85, & 206—208, fig. 44. 1951; Moldenke, Résumé 126 & 462. 1959; Moldenke, Phytologia 12: 23. 1965; Moldenke, Résumé Suppl. 12: 5. 1965.

Illustrations: Ragonese, Revist. Invest. Agric. 5: 209, fig. 44. 1951.

Shrub, resembling a small Eryngium; stems creeping, divaricate, tetragonal, scabrous; leaves decussate-opposite, small, sessile, ovate-lanceolate, spinescent at the apex, incised or few-lobed to entire along the thickened revolute margins, lepidote-granulose and setulose-hispidulous, the lobes 1 or 2 pairs, spreading, subulate-spinescent, "setulis e gramula solitariis"; peduncles patent, greatly surpassing the subtending leaves; bractlets ovate-lanceolate, spinescent-acuminate, the exterior ones longer and subequaling the heads; heads turbinate-ovoid; sepals 2, somewhat coherent at the base, obtuse at the apex, one spatulate-oblong,

the other broader and emarginate; corolla hypocrateriform, varying from purple, bright-violet, lilac, bluish, or blue to pink, cream-color, whitish, or white, twice as long as the calyx, dilated from a tubular base, the upper lip emarginate, with very short subtruncate lobes, the middle lobe broader than the lower lip; stamens didynamous, the lower ones inserted at the middle of the corolla-tube; anthers subsessile; style much longer than the 2-celled ovary; stigma somewhat dilated.

The type of this species was apparently collected in thickets on the salt desert of Santiago del Estero, Argentina, although Macbride photographed Hieronymus & Lorentz 494, from somewhere in Catamarca, as the type (his type photograph number 17539), deposited in the herbarium of the Botanisches Museum in Berlin, but now destroyed.

The page reference for the original publication of the binomial is given as "234", "242", or "244" by some authors. Grisebach apparently regarded the species as belonging to a subgeneric group Diphyllocalyx, but that name more properly refers to the genus Nashia Millsp.

Lippia salsa has been found growing in dry red soil, saline soil, and very salty red soil, on mountainsides, hillslopes, in barnyards, and at salt mines, at altitudes of 270 to 700 meters, flowering from October to May, fruiting in May and November. A vernacular name recorded for it is "yerba del ciervo".

The flowers are described as "blue" or "bluish" on Venturi 7696, "bright violet" on Venturi 484, "cream-color" on Villafañe 7, "lilac" on Venturi 10300, "pink to white" on Ruíz Leal 9099, "pink, lilac to whitish" on Ruíz Leal 8839, "purple" on Bartlett 19759, "whitish" on Ragonese 6271, and "white" on Ragonese & Piccinini 6049, Venturi 5641, and Wall & Sparre s.n. [Metero, 9/11/46].

Ragonese (1951) says: "Camófita o fanerófita de hasta 90 cm de altura, de hojas opuestas, rigidas, sésiles, profundamente inciso-dentadas, con dientes agudos, más o menos punzantes, con el margen revoluto y cubierta por pelos cortos, ralos y rígidos; flores blancas o de color blanco-liláceo, reunidas en inflorescencias turbinado-ovoides, largamente pediceladas. Planta halófila, originaria de nuestro país (Santiago del Estero, Córdoba, Catamarca, Tucumán y Santa Fé). Muy característica en los jumeales de Allenrolfea patagonica, donde suele crecer al abrigo de los arbustos de mayor porte apoyándose en los mismos para trepar."

Material has been misidentified and distributed in herbaria as Verbena sp. In all, 57 herbarium specimens and 5 mounted photographs, including type material, have been examined by me.

Citations: ARGENTINA: Catamarca: Lorentz & Hieronymus 494 [Macbride photos 17539] (It—photo, Kr—photo, N, N—photo, N—photo, W—photo), s.n. [Nov. 10, 1872; Herb. Osten 13001] (Ug). Córdoba: Hauman s.n. [Herb. Mus. Argent. Cienc. Nat. 23985] (N); Hieronymus 494 (W—281551), 675 (W—281552); Kuntze s.n. [Totoralejos, Nov. 1892] (N, W—701566); Kurtz 6760 (N); Ragonese 6271 [Herb. Inst.

Bot. S. Paulo 68549] (N); Ragonese & Piccinini 6049 [Herb. Inst. Bot. S. Paulo 69161] (N); Villafañe 7 (N, N, S). La Rioja: Castellanos s.n. [Los Llanos, El Retamo, Feb. 14, 1940; Herb. Mus. Argent. Cienc. Nat. 33895] (N). Mendoza: Covas 2107 (N), 18541 (N); Ruíz Leal 8839 (N), 8878 (N); Semper s.n. [Desagradero, 14--18.II.1944] (W--1933993), s.n. (Ca). San Luis: Ruíz Leal 9099 (N). Santiago del Estero: H. H. Bartlett 19759 (Ca--3494, Ca--772455, Mi, W--1858379, W--1904664, W--1907601); Kuntze s.n. [Prov. Santiago, Oct. 1892] (N, N); Lillo 6069 [Herb. Inst. Miguel Lillo 32010] (N); Luna Risso 51 (N), 1404 (N); Maldonado 322 (N); Sparre 427 (S); Venturi 5641 [Herb. Osten 20816] (E--960018, Gg--157953, Ug, W--1591476), 10300 (N, S); Wall & Sparre s.n. [Metero, 9/11/46] (Ew, Ew, Ew). Tucumán: Bailetti 345 [Herb. Inst. Miguel Lillo 32011] (N); Dinelli s.n. [Lules, April 10, 1912; Herb. Inst. Miguel Lillo 32009] (N); Monetti s.n. [Los Decimoas, May 28, 1913; Herb. Inst. Miguel Lillo 32012] (N, N); Venturi 484 [Herb. Inst. Miguel Lillo 32007] (N, S, W--1591219), 7696 [Herb. Osten 20853] (Ca--397872, Gg--166881, N, N, S, Ug, W--1441070).

LIPPIA SALVIAEFOLIA Cham., Linnaea 7: 227. 1832.

Synonymy: Lippia polycephala Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 307--309. 1904. Lippia polycephala var. aemilii Briq., Bull. Herb. Boiss., sér. 2, 4: 1155. 1904. Lippia polycephala var. genuina Briq., Bull. Herb. Boiss., sér. 2, 4: 1155. 1904. Lippia sidoides Schau. ex Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 307, in syn. 1904 [not L. sidoides Cham., 1832]. Lippia origanoides Schau. ex Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 307, in syn. 1904 [not L. origanoides Humb., 1825, nor Humb. & Bonpl., 1840, nor Humb. & Kunth, 1843, nor H.B.K., 1818, nor Kunth, 1847]. Lippia polycephala var. aemillii Briq. apud Moldenke, Lilloa 8: 425, sphalm. 1942. Lippia polycephala var. typica Briq. ex Moldenke, Résumé Suppl. 5: 7, in syn. 1962. Lippia origanoides var. sampaionis Hert. ex Moldenke, Résumé Suppl. 10: 6, in syn. 1964. Lippia salviifolia Cham. ex Moldenke, Résumé Suppl. 10: 6, in syn. 1964. Lippia salviaefolia Cham. & Schl. ex Moldenke, Résumé Suppl. 11: 7, in syn. 1964.

Bibliography: Cham., Linnaea 7: 227. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 598. 1843; Walp., Repert. Bot. Syst. 4: 51. 1845; Schau. in A. DC., Prodr. 11: 576. 1847; Schau. in Mart., Fl. Bras. 9: 225. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1155--1156. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 491. 1904; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 307--309. 1904; Ha-

yek, Denkschr. Kaiser. Akad. Wiss. Math.-nat. 79 (1): 295. 1908; Prain, Ind. Kew. Suppl. 3: 104. 1908; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 540. 1911; Moldenke, Lilloa 5: 427. 1940; Moldenke, Suppl. List Invalid Names 6. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37, 40, 41, 43, & 96. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Lilloa 8: 425 (1942) and 10: 379 & 380. 1944; Moldenke, Alph. List Cit. 1: 27, 56, 90, 121, 141, 201, 255, & 264. 1946; Moldenke, Lilloa 14: 45. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 63. 1948; Moldenke, Alph. List Cit. 2: 362--364, 366--368, 413, 441, 457, 490, 534, 535, 550, 551, & 553 (1948), 3: 689, 751, 815, 835, 837, 863, 923, & 935 (1949), and 4: 998, 1081, & 1094. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81, 97, 99, 105, 189, & 191. 1949; Moldenke, Phytologia 3: 287 & 289. 1950; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 349. 1951; Troncoso, Darwiniana 10: 88--89. 1952; Moldenke, Résumé 94, 114, 117, 126, 316, & 462. 1959; Troncoso, Darwiniana 12: 258--260 & 280. 1961; Moldenke, Résumé Suppl. 5: 6 & 7 (1962), 10: 6 (1964), 11: 7 (1964), and 12: 10 & 11. 1965; Moldenke, Phytologia 12: 23, 39, 47, 152, 170, 172, 179, 203, 253, 275, 310, 331, & 366. 1965.

Suffrutescent shrub, 0.8--2 m. tall; stems woody at the base; branches divaricate-ascending, the older ones with gray bark; branchlets virgate, tetragonal or subtetragonal, subpulverulent-glandulose and hirtellous-tomentose or densely pubescent-tomentulose with short antrorse hairs; upper internodes 3--8 cm. long; leaves decussate-opposite, rather small, short-petiolate, subpatent; petioles 5--8 mm. long, tomentulose; leaf-blades chartaceous, elliptic-obconic or ovate-oblong, 3--5 cm. long, 1.3--2.5 cm. wide, gradually smaller upwards on the branchlets, penninerved, rugose, much smaller among the inflorescences, acute or apiculate to rather obtuse at the apex, closely and minutely crenulate along the margins and more convex at the midpoint, with teeth to 1 mm. high and 1--2 mm. apart, rounded at the base and attenuate into the petiole, gray-green and pubescent-hirtellous or tomentellous above, densely but loosely hirtellous-tomentose and canescent or canescent-tomentellous beneath; venation more or less impressed above, prominent and reticulate beneath; secondaries 7--9 per side, conspicuously transversely anastomosing; inflorescence subpulverulent-glandulose and hirtellous-tomentose, often forming an interrupted composite raceme with verticillate axillary flowers or a pyramidal leafy panicle with floriferous branchlets issuing from the lower leaf-axils; peduncles axillary, aggregate, 8—14 per leaf-axil, flaccid, short, filiform, 6—10 mm. long, surpassing only the uppermost leaves, patulous-reflexed, subtetragonal, densely tomentellous with antrorse hairs; heads tetraquetrous-subglobose, small, 5--7 mm. long, 5--6 mm. wide, grayish or greenish when dry, the lowermost surpassed by the subtending leaves, the upper equaling or surpassing the leaves; bractlets membranous, ovate or broadly ovate, 2--3 mm. long, acuminate at the apex, spreading, shorter than the corolla-tube, the apex folded and recurved, connate at the base, rather long-villosulous or villous on the keel and ciliate at the margins; flowers greenish

or yellowish when dry; calyx minute, campanulate, compressed, about 0.6 mm. long, bifid or subbilabiate, antrorsely pubescent on the outside, ciliate, the lobes very shortly 2-dentate or obscurely lobulate; corolla hypocrateriform, white or yellowish-white, greenish or yellow when dry, surpassing the calyx by 3--4 mm., pubescent on the outside, the tube exserted, gradually ampliate upwards, rather densely puberulous on the outside, the limb small, the lobes very unequal, 0.5—1 mm. long, the larger ones ovate-rounded or subquadrate, crenulate and crisped at the margins, the anterior one largest, obcordate, and about 1 mm. long; stamens and pistil normal for the genus; fruit not seen.

The type of this handsome species was collected by Friedrich Sellow in São Paulo, Brazil (Chamisso says merely "E Brasilia misit Sellowius"), and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17541, but is now destroyed. The type of L. polycephala was collected by Emil Hassler (no. 4624) on arid hills at Caacupé, Paraguay, on December 8, 1882, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. The type of L. polycephala var. aemilii was gathered by Hassler (no. 6720) in the region of the upper Río Y-acá, Paraguay, in December, 1900, and is also deposited at Geneva -- an isotype was photographed by Macbride in the Berlin herbarium as his type photograph number 17533. The type of L. origanoides var. sampaionis was collected by Wilhelm Gustav Herter (no. 456) in Minas Geraïs, Brazil, and is deposited in the United States National Herbarium at Washington. The L. salviaefolia var. parvifolia Mart. is a synonym of L. gracilis Schau.

Schauer (1847) places the species in his Section Goniostachyum. Briquet (1904), in speaking of his L. polycephala, describes the leaf-venation as "triplici-penninervis" and comments that "Cette espèce est connus depuis longtemps du Brésil. Nous lui rapportons les provenances suivantes, représentées à l'herbier Delessert: Minas Geraës (Claussen, envoi de mars 1839, sans numero): Caxoeira do campo, Minas Geraës, apr. 1839 (Claussen nc. 128, env. de janvier 1840): Serra do Frio, Minas Geraës (Vauthier no. 411, ann. 1833): prov. de Piauhy (Gardner n. 2714, juill.--sept. 1839). Ces plantes ont été rapportées par Schauer, pour autant qu'il les connaissait, au L. sidoides Cham. Cette détermination est jusqu'à un certain point justifiée, parce que Chamisso a fait suivre (l. c.) la description princeps du L. sidoides de la description de trois autres plantes différentes rattachées par l'auteur au L. sidoides, ce qui rend son espèce peu claire. L'original de Sellow, sur lequel est basé le L. sidoides, se distingue facilement du L. polycephala par ses rameaux glabrescents, ses feuilles plus minces obtusément dentées, scabres à la face supérieure (indument velouté dans le L. polycephala), très cunéiformes à la base, ses capitules moins nombreux, brièvement pedonculés, etc. Jusqu'à ce que des formes intermédiaires soient venues combler la lacune existante entre les L. sidoides et L. polycephala -- formes que nous n'avons

pas encore rencontrées dans les herbiers — nous devons considérer les L. sidoides et L. polycephala comme des espèces distinctes. D'autres échantillons provenant de Martius sont rattachés dans l'herbier De Candolle par Schauer au L. origanoides Kunth, espèce qui, d'après la description de Kunth, s'en écarte par ses feuilles arrondies à la base, ses capitules dépassant à peine les pétioles, ses bractées pubescentes et ciliées, etc."

The flowers are described as "whitish-yellow" on F. C. Hoehne s.n. [Butantan, April 12, 1918] and as "white" on Brade 5744, Hassler 6720, Herb. Osten 18178, Herb. Serv. Florest. Est. S. Paulo 787, Mendes Magalhães 1887, Mosén 1526, Pickel 787 & s.n. [Itaporanga, Feb. 17, 1944], Riedel 1778, and Rojas 2517 & 2543.

The species has been found growing on campos and shrubby campos, high very stony campos and campo cerrado, among bushes, in open fields, along roads, and at the borders of woods, flowering from November to April and in September. Mosén says that it is frequent in dry places.

Schauer (1847 & 1851) cites unnumbered collections of Lund, Raben, Riedel, and Sellow from São Paulo, as well as Silva-Manso s.n. [Herb. Martius 1032] from Matto Grosso in the Berlin, Munich, and DeCandolle herbaria; Hayek (1908) cites Campos Novaes s.n. from Campinas (which may be the Campos Novaes 930 cited below); Glaziou (1911) cites his number 14157 as L. velutina; Troncoso (1961) cites an isotype of L. polycephala in the Leiden herbarium. The Kuntze s.n. [Velasco, 200 m., VII.92], cited below, may actually represent L. affinis Schau.

Material of L. salviaefolia has been misidentified and distributed in herbaria under the names L. affinis Schau., L. martiana Schau., L. pseudothea Schau., L. sidoides Cham., and L. velutina Schau. On the other hand, the Martius s.n. [Villa Nova da Rainha], distributed as L. salviaefolia, is actually L. grata Schau.

In all, 92 herbarium specimens and 13 mounted photographs, including type or phototype material of most of the names involved, have been examined by me.

Citations: BRAZIL: Matto Grosso: F. C. Hoehne Com. Rondon 2239 (N), 4744 (Sp); Silva-Manso 226 [Herb. Martius 1032] (Br), 1032 (Br). Minas Gerais: Glaziou 14157 (N, W—1706157); Herter 456 [Herb. Mus. Nac. Rio Jan. 14856] (W—1199584); Mendes Magalhães 1887 (W—2124207); Puttemans s.n. [Herb. Campos Novaes 545] (N, Sp—15681). São Paulo: Brade 5744 (N, N, S, Sp—6732); Campos Novaes 930 (W—389896); Eiten & Eiten 2565 (W—2445187); Hammar s.n. [Mogy-mirim, Feb. 11, 1902; Herb. Com. Geogr. & Geol. S. Paulo 5852] (N, Sp—15694); Heiner 388 (S); Hemmendorff 84 (S), 85 (N, S), 88 (S), s.n. [Santa Rita do Passa Quatro] (S); Herb. Com. Geogr. & Geol. S. Paulo 5851 (N, Sp—15686); Herb. Inst. Agron. S. Paulo 89 (N, Sp—7623); Herb. Mus. Paulista 1872 (N, Sp—15677); Herb. Richard s.n. [Sorocaba, 1844] (W—238077); F. C. Hoehne s.n.

[Butantan, April 12, 1918] (N, Sp—1782); W. Hoehne 240 (Mg, N), 340 (Wh, Wh), 2248 (Mg, N), 2384 (N), 2385 (N), s.n. [Caieiras, 25/1/1945] (Wh, Wh, Wh, Wh, Wh), s.n. [Caieiras, 22/8/1945] (Wh), s.n. [Alta da Lapa, 10/4/1946] (Wh, Wh, Wh, Wh, Wh, Wh); Mosén 1526 (S); Pickel 787 (Sf), 996 (Sf), 1294 (Sf), s.n. [Itaporanga, Feb. 14, 1944; Herb. Serv. Florest. Est. S. Paulo 787] (W—1564374), s.n. [Helvetia, Jan. 18, 1945; Herb. Serv. Florest. Est. S. Paulo 996] (W—1564392); Raben 508 (Br); L. Riedel 1778 (N); Sellow s.n. [Macbride photos 17541] (It—photo of type, Kr—photo of type, N—photo of type, W—photo of type); Toledo s.n. [Rincão, Jan. 25, 1928] (N, Sp—24006); Usteri s.n. [Jundiahy, Jan. 27, 1907; Herb. Polytech. S. Paulo 258b] (N, Sp—15671); Viegas & Kiehl s.n. [29 Marco 1939; Herb. Inst. Agron. Est. S. Paulo 3900] (N), s.n. [Herb. Inst. Agron. Est. S. Paulo 3904] (W—1775596). State undetermined: Collector undesignated 211 (Sp—20069). BOLIVIA: Santa Cruz: Kuntze s.n. [Ost Velasco, VII.92] (N), s.n. [Velasco, 200 m., VII.92] (W—701991). PARAGUAY: Balansa 4624 (N); Fiebrig 4234 (Cb, Cb, V); Hassler 6720 [Macbride photos 17533] (Ca—944346, It—photo, Kr—photo, Mi, N, N, N—photo, S, S, W—photo); T. Rojas 2517 [Herb. Osten 18178] (N, N, Ug), 2543 [Herb. Osten 18174] (F—photo, N, N—photo, Sg—photo, Ug, Z—photo). ARGENTINA: Misiones: Quiroga 350 [Herb. Osten 7706] (Ug), s.n. [San Ignacio, March 15, 1914; Herb. Osten 7706] (S); D. Rodriguez 625 [Herb. Mus. Argent. Cienc. Nat. 23838; Herb. Inst. Miguel Lillo 32361] (Ca—3509, N, N, W—1802579); A. G. Schulz 7107 (Z).

LIPPIA SANDWITHIANA Moldenke, Lilloa 5: 427—428. 1940.

Bibliography: Moldenke, Lilloa 5: 427—428. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96. 1942; Moldenke, Alph. List Cit. 1: 264. 1946; Moldenke, Lilloa 14: 45—46. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 31. 1948; Moldenke, Alph. List Cit. 4: 1165. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99 & 191. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 117 & 462. 1959.

Perennial herb, woody at the base; stems erect, few or numerous, slender, densely hirsute-hispidulous with white hairs to 2 mm. long, not much branched; leaves decussate-opposite, numerous, sessile, aromatic; leaf-blades firmly chartaceous and stiff, oblong or elliptic, 0.8—4 cm. long, 0.6—2.4 cm. wide, acute at the apex, rounded or cordate at the base, uniformly and regularly serrulate from the base to the apex with very numerous and small blunt teeth, hirsute-hispidulous on both surfaces, more densely so beneath, conspicuously bullate above; inflorescence axillary, shorter than the subtending leaves, sparse, solitary in the upper leaf-axils, decussate-opposite; peduncles very slender, hirsute-hispidulous like the adjacent branches, 5—8 mm. long; corolla hypocrateriform, yellow.

The type of this species was collected by Emil Hassler (no.

11031) in a calcareous region along the upper course of the Río Apa, Paraguay, in March, 1913, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. The species has been found on limestone campos and is said by Anisits to be "common" in limestone soil. It has been collected in anthesis in December, January, and March, and is named in honor and commemoration of Noël Yvri Sandwith, world-famous expert on American plants and most especially on the Bignoniaceae, whose recent death was an irreparable loss to the science of botany.

In all, 7 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: PARAGUAY: Anisits 2336 (S), 2517 (N, S); Hassler 11031 (Cb--type, K--isotype, N--isotype, N--isotype, N--photo of type, Z--photo of type).

LIPPIA SATUREIAEFOLIA Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 586. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 586. 1847; Schau. in Mart., Fl. Bras. 9: 239. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 151. 1895; Hayek in Engl., Bot. Jahrb. 42: 166. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96 (1942) and [ed. 2], 81 & 191. 1949; Moldenke, Alph. List Cit. 3: 691 & 710. 1949; Moldenke, Résumé 94 & 462. 1959; Moldenke, Phytologia 12: 24. 1965.

Small shrub, to almost 1 m. tall, densely covered with shiny ferruginous glandular pulverulence; stems subsimple or few-branched above; lateral branchlets abbreviated; leaves small, decussate-opposite, crowded; leaf-blades lanceolate, 6--10 mm. long, 2 mm. wide, folded, obtuse at the apex, entire along the margins, attenuate at the base, 1-veined; peduncles very short; heads solitary in the uppermost leaf-axils, subglobose, equaling the subtending leaves and surrounded by them; bractlets concave, imbricate, obovate-elliptic, obtuse at the apex, villous along the margins, shorter than the corolla-tube; calyx bifid, glandulose, subvillous, the teeth obtuse; corolla hypocrateriform, 4 mm. long, pubescent on the outside, glandulose above, its tube rather straight, subcylindric, whitish, slightly ampliate above, the limb rose, the throat yellowish, the lobes rounded.

The type of this apparently very rare species was collected by Carl Friedrich Philipp von Martius (no. 1377) "in campis siccis editis districtus Serro Frio prov minarum ad Tejuco et Lavras da Pindaiba", Minas Gerais, Brazil, flowering in June, and is deposited in the Martius Herbarium at Munich, where it was photographed by Macbride as his type photograph number 20333. Schauer (1847) places the species in his Section Zapania, Subsection Axilliflorae. He says of it: "Species omni ratione perinsignis, inprimis vero indumento pulvereo-glanduloso, in planis Verbenaceis saepe occurente et hinc inde in lepides abeunte hic tamen maxime exculto sub microscopio vesiculas subglobosas basi affixas oleoque aromatico

repletas exhibente." Of its leaves he says "eoque modo complicata ut facies plane dispareat." The species is known to me only from what is stated of it in its literature and from 5 mounted phototypes which have been examined by me.

Citations: BRAZIL: Minas Gerais: Martius 1377 [Herb. Monac. 128; Macbride photos 20333] (It--photo of type, Kr--photo of type, N--photo of type, N--photo of type, W--photo of type).

LIPPIA SAVORYI Meikle, Kew Bull. 17: 173--174. 1963.

Synonymy: Lippia multiflora var. pubescens Moldenke, Phytologia 3: 271. 1950. Lippia africana var. sessilis Moldenke, Phytologia 3: 271. 1950. Lippia nigeriensis var. brevipedunculata Moldenke, Phytologia 3: 272--273. 1950. Lippia wilmsii var. sessilis (Moldenke) Moldenke, Phytologia 4: 179. 1953. Lippia adoensis sensu Hutch. & Dalz. apud Meikle, Kew Bull. 17: 173, in syn. 1963 [not L. adoensis Hochst., 1841].

Bibliography: Hutch. & Dalz., Fl. W. Trop. Afr. 2: 270. 1931; Moldenke, Phytologia 3: 271--273 (1950), 3: 455 & 456 (1951), and 4: 179. 1953; Moldenke, Biol. Abstr. 27: 1887 & 2026. 1953; Moldenke, Résumé 138, 142, 462, & 463. 1959; Moldenke, Résumé Suppl. 3: 33. 1962; Meikle, Kew Bull. 17: 173--174. 1963; Anon., Assoc. Etud. Tax. Fl. Afr. Trop. Index 1963: 60. 1964; Moldenke, Résumé Suppl. 11: 5 (1964) and 12: 5, 7, 10, & 11. 1965; Moldenke, Phytologia 12: 299--300 & 305--306. 1965.

Perennial woody herb, small shrub, or subshrub, erect, 0.5--2 m. tall, aromatic; stems subterete or more or less distinctly hexagonal, brown, scabridulous, sparsely or densely strigose-pubescent; branches densely strigose-pubescent; leaves sessile or subsessile, ternate or in whorls of 4--6, firm, rigid; petioles very short, densely strigose-pubescent; leaf-blades lanceolate or ovate to oblong-ovate or narrow-elliptic, 2.5--8 cm. long, 0.4--3 cm. wide, serrate along the margins, bullate and very scabrous above with more or less dense bulbous-based hairs and more or less scabrous-pilose, densely short-pilose beneath; venation conspicuously impressed above, the midrib and secondaries prominent beneath, the venation elegantly reticulate; inflorescence irregularly verticillate-spicate, unbranched, 1.5--3 cm. in all, equaling or slightly exceeding the subtending leaves; peduncles densely strigose-pubescent or white-villous; spikes often 2--4 per node, sometimes densely corymbose-glomerate at the apex of the inflorescence, ovoid or subcylindric, to 2 cm. long and 1.3 cm. wide, hard, short-pedunculate, the rachis densely white-villous; bractlets ovate-spatulate, about 4.5 mm. long and 3 mm. wide, acute or short-cuspidate at the apex, densely white-villous on the outside, glabrous on the inside, shiny; corolla hypocrateriform, to 4 mm. long, white or whitish to lemon-yellow or purplish, often yellowish in the throat, or the outer flowers cream-colored, the center green, distinctly pubescent on the outside; cocci navicular, about 2 mm. long and 1 mm. wide, long white-villous on the back.

The type of this species was collected by H. J. Savory [Herb. Univ. Coll. Ibadan 108] — in whose honor it was named — at Kurra

Falls on the Jos Plateau, Northern Nigeria, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The type of L. multiflora var. pubescens was collected by H. V. Lely (no. 241) at Naraguta, at an altitude of 4000 feet, Northern Nigeria, on May 30, 1921, also deposited at Kew; that of L. nigeriensis var. brevipedunculata was gathered by the same collector (no. P.40) in groups after fires at Banchi in January, 1929, also deposited at Kew; and that of L. africana var. sessilis was gathered by the same collector (no. 320) at Naraguta, on June 23, 1921, deposited at Kew.

According to Meikle (1963) this is the L. adoensis of Hutchinson & Dalziel (1931), in part. The true L. adoensis of Hochstetter is a synonym of L. abyssinica (Otto & Dietr.) Cuf. The flowers of L. savoryi are described as "purplish" on Lely 241, "lemon-yellow" on N. M. Pritchard 306, "white" on Barbosa & Moreno 10167 and C. Henriques 49, and "outer flowers cream-colored, center green" on Lely 320. The plant has been found growing on river-banks and at altitudes of 1330 to 1875 meters, flowering in January and from May to July. A vernacular name recorded for it is "okwamgo" in the Congo.

Lippia multiflora var. pubescens and L. nigeriensis var. brevipedunculata were kept as valid by me earlier in this series of notes on the genus, but a re-examination of type material has convinced me that my friend Meikle is correct in his disposition of them.

Material of L. savoryi has been misidentified and distributed in herbaria under the names L. adoensis Hochst., L. asperifolia Rich., and L. scaberrima Sond.

This taxon differs from L. wilmsii in having its leaves firm and rigid, sessile or subsessile, in whorls of 3—6, often narrow-elliptic, 2.5—8 cm. long, 0.4—3 cm. wide, very scabrous and bullate above, and the inflorescences whorled in 4's, equaling or slightly surpassing the subtending leaves; from L. nigeriensis in having the leaves regularly whorled, 2.5—8 cm. long, 0.4—3 cm. wide, and bullate above, and the inflorescences unbranched and only 1.5—3 cm. long in all; from L. multiflora in its stems, branches, petioles, and peduncles being densely strigose-pubescent, and its leaf-blades more or less scabrous-pilose above and densely short-pubescent beneath.

Meikle (1963) cites the following specimens, presumably all in the Kew herbarium, in addition to the ones seen by me: NIGERIA: Northern: Batten-Poole 207 & 230; Coombe 21 & 112; Dalziel 177; Lely 69; McClintock 244; Meikle 1059 & 1344; Savory s.n. [Herb. Univ. Coll. Ibadan 108]. He states that the taxon has not been recorded from outside of Northern Nigeria, but this is erroneous — it is known also through specimens from the Republic of Congo and from Angola.

In all, 10 herbarium specimens, including the types of most of

the names involved, and 12 mounted photographs have been examined by me.

Citations: NIGERIA: Northern: Lely 241 (F--photo, K, N, N--photo, Sg--photo, Z--photo), 320 (F--photo, K, N, N--photo, Sg--photo, Z--photo), P.40 (F--photo, K, N, N--photo, Sg--photo, Z--photo). CONGO LEOPOLDVILLE: Kevers 48 (Br). ANGOLA: Huíla: Barbosa & Moreno 10167 (Ul); C. Henriques 49 (Ul); N. M. Pritchard 306 (Ul).

LIPPIA SCABERRIMA Sond., Linnaea 23: 87. 1850.

Synonymy: Camara salviaefolia β transvalensis Kuntze, Rev. Gen. Pl. 3 (2): 250. 1898. Lippia transvalensis (Kuntze) Moldenke, Phytologia 1: 428. 1940. Lantana salviifolia f. transvalensis Kuntze ex Moldenke, Suppl. List Invalid Names 4, in syn. 1941. Lippia transvaalensis (Kuntze) Moldenke, Alph. List Invalid Names Suppl. 1: 15, in syn. 1947. Camara salviifolia var. transvalensis Kuntze ex E. J. Salisb., Ind. Kew. Suppl. 10: 134, in syn. 1947.

Bibliography: Sond., Linnaea 23: 87. 1850; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; Kuntze, Rev. Gen. Pl. 3 (2): 250. 1898; H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 194--195. 1901; H. H. W. Pearson, Trans. S. Afr. Phil. Soc. 15: 176. 1905; Moldenke, Phytologia 1: 428 (1940), 1: 504 (1941), and 2: 53. 1941; Moldenke, Suppl. List Invalid Names 2 & 4. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 52 & 96. 1942; Moldenke, Alph. List Invalid Names 12. 1942; E. J. Salisb., Ind. Kew. Suppl. 10: 134. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 12 & 15. 1947; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 48. 1947; Moldenke, Alph. List Cit. 2: 628 (1948), 3: 659 (1949), and 4: 1140 & 1296. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 122 & 191. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 10. 1949; Moldenke, Phytologia 3: 77 (1949), 4: 73 (1952), and 5: 99. 1954; Moldenke, Inform. Mold. Set 49 Spec. 2 (1954) and 51 Spec. 3. 1956; Moldenke, Résumé 152, 154, 248, 307, 317, & 462. 1959; Moldenke, Résumé Suppl. 8: 4 & 5. 1964; Moldenke, Phytologia 12: 231, 232, 306, 344, & 358. 1965.

Perennial herb. low or small slightly spreading subshrub, or erect aromatic scabrid shrub, to almost 1 m. tall, more or less bushy, with several to many stems or branches from the rootstock; stems and branches tetragonal, striate, scabrid, glanduloso; leaves decussate-opposite, aromatic, narrowly lanceolate or elliptic-lanceolate, 2.5--3.7 cm. long, 4--6 mm. wide, subacute at the apex, crenate-serrulate along the margins from about the middle to the apex, entire toward the base and narrowed into the very short petiole, scabrid on both surfaces, profusely punctate-glandular, 3-veined at the base, the margins scabrid, the primary veins impressed above and prominent beneath; spikes ovoid, solitary, to 12 mm. long, 4--10 mm. in diameter; peduncles striate, 2.5--5 cm. long, scabrid-puberulous; bractlets surpassing the flowers, broadly ovate, 4--10 mm. long, 3--6 mm. wide, greenish-yellow, short-cuspidate at the apex or sometimes rounded and ob-

tuse, entire and ciliate along the margins, glandular-puberulent or -pubescent, with parallel veins; calyx 2-lobed, compressed, mitre-shaped, 1/3—1/2 as long as the corolla, pubescent outside, glabrous within, the lobes acute, obtuse, or rounded at the apex, 0.5--1 mm. long; corolla hypocrateriform, white or cream to pale-cream colored, 3--4.5 mm. long, glandular-pubescent on both surfaces, the anterior lip broad, with a sinuate margin, rounded or subemarginate at the apex, larger than the broadly oblong posterior lip; ovary and style 2--3 mm. long; fruit smooth, semiglobose, 1.5—2 mm. long, glabrous.

The type of this species was collected by Carl Ludwig Philipp Zeyher (no. 1372) along the Sand River, Orange Free State, South Africa. The type of Camara salviaefolia β transvalensis was collected by Carl Ernst Otto Kuntze at Johannesburg, Transvaal, South Africa, and is deposited in the Britton Herbarium at the New York Botanical Garden.

The species has been found growing in sandy soil, on the veld, along roadsides, in sandy dry soil in Acacia thornveld, on rocky dolomite slopes, and in sandy open treeveld along with Combretum, Terminalia, and Acacia, at altitudes of 2000 to 6000 feet, flowering in February, April, and December, and fruiting in April. Vernacular names recorded for it are "Benke's bossie", "beukesbossie", and "mosukotswane". The Burke s.n. [Sand River, April] was distributed in herbaria as "Lippia sp. nov." F. A. Rogers 357 is a mixture with L. javanica (Burm. f.) Spreng.; Brueckner 439 is very immature and anomalous.

Badenhorst states that this species is used in the treatment of sore eyes and stomach troubles, and that it taints the milk of cows eating it. The corollas are described as "white" on Galpin M.753 and Rodin 3518, "cream" on Brueckner 439, and "white to pale cream-colored" on Meeuse 9453.

Pearson (1901) distinguishes this species from related South African ones as follows:

1. Calyx distinctly 2-lobed.
  2. Bractlets more than 4 mm. long and 3 mm. wide, surpassing the flowers.....L. scaberrima.
  2a. Bractlets less than 4 mm. long and 3 mm. wide, not surpassing the flowers.....L. javanica.
1a. Calyx truncate, subtruncate, or obscurely lobed.
  3. Leaf-blades serrate or crenate-serrate.
    4. Bractlets more than 4 mm. long; calyx truncate or obscurely 4-toothed.....L. wilmsii.
    4a. Bractlets less than 4 mm. long; calyx obscurely 2-lobed.....L. rehmannii.
  3a. Leaf-blades crenate.....L. pretoriensis.

Dr. Meeuse, however, in a letter to me dated December 9, 1953, says of Pearson's key: "His calyx-character (distinctly lobed or indistinctly lobed to truncate) is useless, to my mind, so that L. wilmsii cannot on very good grounds be separated from L. scaber-

rima." Pearson (1905) says that his L. pedunculata differs from L. scaberrima in having a 4-toothed calyx, smaller bractlets, more pronounced hairiness, and a comparatively smoother surface to the whole plant.

Material of L. scaberrima has been misidentified and distributed in herbaria as L. wilmsii H. H. W. Pearson; on the other hand, the C. Henriques 49, distributed as L. scaberrima, is actually L. savoryi Meikle, while Meeuse 9029 and Pott 5648 are L. wilmsii.

Pearson (1901) cites Zeyher 1372, Burke s.n. [Sand River], and Mrs. Bowker 665 from the Orange Free State; Holub s.n. [banks of the Vaal and Harts Rivers] from Cape of Good Hope; Holub s.n. [Barolong Territory] from Bechuanaland; and Gilfillan s.n. [Jeppes Town Ridges, Johannesburg, about 6000 ft.; Galpin 6246] from Transvaal.

In all, 38 herbarium specimens and 6 mounted photographs, including type material of all the names involved, have been examined by me.

Citations: BECHUANALAND PROTECTORATE: Rodin 3518 (Ca--802639, S, W--2962914). SOUTH AFRICA: Cape of Good Hope: Acock 8320 (N, S, S); Brueckner 439 (Cb); W. J. Foley s.n. [Herb. Nat. Mus. Pret. 2801] (Af); Herb. Mus. Bot. Stockholm s.n. (S); Holub s.n. [banks of Vaal and Harts rivers] (Af); Wahlberg s.n. [Goda Hopps Udden] (S). Natal: Haygarth s.n. [J. M. Wood 10790] (N--photo, Vt, Z--photo). Orange Free State: Barrett-Hamilton s.n. [1901--1902] (N); Burke s.n. [Sand River, April] (Ut--11485); A. Peter 50887 [S.35] (B); Zeyher 1372 (F--photo of type, N--isotype, N--photo of type, S--type, Si--photo of type, Z--photo of type). Transvaal: Badenhorst s.n. (Af); Barnard & Mogg 743 (Cb); M. Collins s.n. [I.1909] (Cb); R. A. Dyer 5448 (Z); E. E. Galpin M.753 (Af, Br); Gilfillan s.n. [Johannisburg; Sonder 6246] (Af); Herb. Patchelstroom Sch. Agr. 23 (Af); Kirges 1868 (Af); Kuntze s.n. [Johannisburg] (Br, N); R. Leendertz s.n. [3.X.1910] (S); B. A. M. Liebenberg 149 (Br); Lieuwenhertz 75 (Af), 149 (Af); Louis 501 (Af); Meeuse 9453 (Ss), 9475 (Ss); H. K. Munro PS.139 (Af); F. A. Rogers 357, in part (S); J. D. Sutton 88 (Af).

LIPPIA SCAPOSA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1162--1163. 1904.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1162--1163. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 498--499. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Lilloa 8: 425 (1942) and 10: 380. 1944; Moldenke, Alph. List Cit. 1: 264 (1946) and 2: 600. 1948; Moldenke, Lilloa 14: 46. 1948; Moldenke, Alph. List Cit. 3: 689 (1949) and 4: 1239. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99 & 191. 1949; Moldenke, Ré-

sumé 117, 317, & 462. 1959; Troncoso, Darwiniana 12: 258 & 289. 1961; Troncoso, Bol. Soc. Argent. Bot. 9: 184. 1961; Moldenke, Phytologia 12: 24 & 84. 1965.

Medium-sized dioecious herb, to 0.6 m. tall; caudex hard, oblique or subhorizontal; stems and aerial branches green, erect, slender, tetragonal, shortly spreading-pilosulous at the base or glabrescent, strigose above with antrorse hairs; lower internodes 2--10 cm. long; scape 20--25 cm. tall; leaves small, decussate-opposite, few, sessile or subsessile, the lowest obovate, obtuse at the apex, the rest elliptic, acute at the apex, all constricted or broadly rounded at the base, entire or with 1 or 2 large teeth toward the apex, green on both surfaces, more or less roughened with antrorse strigose hairs, sometimes rather thick, the venation more or less prominulent beneath; inflorescence terminal, paniculate, the axes all strigose with antrorse hairs; lower peduncles to 5 mm. long, the upper ones almost obsolete; heads small, hemispheric, 5--6 mm. long, finally ellipsoid and 7 mm. long, the lowest rarely borne in the axils of the small upper leaves and long-pedunculate, often in the axils of leaves which have been reduced to lanceolate bracts and which scarcely surpass the heads in length and separated by elongated internodes, or 3 collected at the apex of a very long naked scape; bractlets subovate- or elliptic-lanceolate, green, 4--4.5 mm. long, about 1 mm. wide, acute or short-acuminate at the apex, substrigose with antrorse hairs on the outside, shorter than the flowers; calyx campanulate, minute, less than 1 mm. long, pubescent toward the apex, obscurely bilabiate, repand-denticulate on the rim; corolla hypocrateriform, yellow, surpassing the calyx-mouth by 2.5 mm., the tube exserted, sometimes gradually ampliate from the cylindric base, puberulent toward the apex, the lobes very small, ovate or ovate-rounded, about 0.5 mm. long, the anterior one somewhat larger; stamens and pistil normal for the genus, included; the floral axis after anthesis 5 mm. long, villosulous-tuberculate; fruit not known.

The type of this species was collected by Emil Hassler (no. 6965) on a campo near Valensuela in the region of the upper course of the Río Y-acá, Paraguay, in January, 1900, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva; an isotype in the herbarium at the Botanisches Museum in Berlin was photographed by Macbride as his type photograph number 17542, but is now destroyed. The species has been found growing in fields and campos, flowering in January and March. Jorgensen describes it as "common in the campo". The original description is cited at the Instituto Miguel Lillo as "Plantae Hasslerianae XI (1904) 498".

Briquet (1904) says "Cette gracieuse espèce appartient au groupe des Euzapania à inflorescence terminale. Elle s'écarte de toutes des espèces connues par l'exiguité de ses tiges aeriennes, sa microphyllie, son indument, l'inflorescence, etc. etc." He describes the inflorescence as follows: "Capitula parva hemisphaerica, dein ellipsoidea, infima rarius in axillis parvis foliorum superioris longe pedunculata, saepius in axilla foliorum ad bracteas lanceo-

latas capitula haud superantes reductorum et internodiis elongatis separatis sita, nunc etiam tria in apice scapi longissimi nudi collocata."

Troncoso (1961) places the species in her Subgenus Lippia, Section Lippia, Series Paniculatae, along with L. angustifolia Cham. She cites, in addition, Hassler 6965 (Bm--isotype, Cb--type, Ml--isotype, P--isotype, X--isotype) and says "Especie dioica. El ejemplar tipo, Hassler 6965, aunque aparentemente hermafrodita es funcionalmente ♂, las flores caen sin ser fecundadas. Briquet en su descriptión dice: 'mericarpia adhuc ignota', lo que confirma la opinión de que todo el ejemplar es ♂. Este autor describe, a continuación de la especie, una var. melanocaulos que difiere en: 'caulibus atris nec viridibus, superne ut videtur, magis fistulosis, bracteolis aliq. latioribus, magnis, ovatis. Hassler 6965a'. No he podido ver este ejemplar, pero por el carácter de la brácteas, ovales mayores y más anchas, podría tratarse de la planta ♀."

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## BOOK REVIEW

Clyde F. Reed

"SPORES - FERNS, Microscopic illusions analysed." By Clara S. Hires, Vol. I: i-xxiv, 1-548, 246 plates, numerous text-figures. June, 1965. Mistaire Laboratories, 152 Glen Avenue, Millburn, New Jersey. 07041. $22.50.

This is an excellent book, well written and beautifully illustrated, dealing with the theories and concepts of Miss Clara Hires in regard to the explanation of the microscopic illusions met with in the study of spores, ferns and fern-allies in particular. Miss Hires has spent much time and energy, as well as money, in projecting her analyses of three-dimensional concepts of trilete and monolete spores. This book illustrates in excellent fashion her use of models and diagrams as well as of actual photomicrographs of the spores themselves, and the various types of tetrad development in the various groups of the ferns and fern-allies.

The subject material in this book is presented in good form, and reflects its writers thinking very well. In my opinion it seems well-founded and the selection of illustrations seems sufficient and critical enough to stand verifying. This is an excellent presentation and a notable contribution to our present knowledge of the analysis of spore-formation and spore-evaluation. I highly recommend to any student of fern-spore morphology to read and study this book. Its scope is applicable to paleobotany as well as to present living forms.

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# PHYTOLOGIA

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# GENERIC LIMITATIONS IN THE HOFMEISTERIA COMPLEX (Compositae - Eupatorieae) [1]

R. M. King [2] and H. Robinson [3]

The genus Hofmeisteria (Compositae-Eupatorieae-Eupatoriinae) was established by Walpers in 1847 to include two species, H. fasciculata, and H. (Phania) urenifolia. Of these, H. urenifolia was shortly removed to the genus Fleischmannia on the basis of differences in the pappus (Schultz Bipontinus, 1850). Again on the basis of pappus the genus Malperia S. Watson (1889) has been reduced to synonymy under Hofmeisteria by Johnston (1924). Podophania Baillon (1880) a genus closely resembling Hofmeisteria has been maintained in the subtribe Piquerinae on the basis of supposedly unappendaged anthers.

The present study is an attempt to redefine the limits of these various genera and evaluate the various characters by which they have been distinguished. Monographic studies of the genera are intended to appear separately.

In addition to the regular observations, detailed examinations of the dissected floral parts were made under the compound microscope. Semi-permanent slides were made using Hoyer's Solution (Anderson, 1954). This mounting medium has the advantage of being both water miscible and a clearing agent.

The genus Hofmeisteria is usually distinguished by the pappus consisting of intermixed aristate and squamate bristles. Hofmeisteria, as typified by H. fasciculata (Benth.) Walp., has the following characters: woody sub-shrub. Leaves in 2/5 phyllotaxy (congested at flowering nodes, appearing whorled), petiolate, mostly pinnately to bipinnately dissected; somewhat fleshy. Peduncles rather long, bearing a few minute leaves, becoming lateral by innovation. Heads solitary, massive. Phyllaries numerous, multiseriate, densely imbricated, narrowly lanceolate. Florets 100-150. Corolla narrowly tubular glabrous, with short lobes. Anther sacs long and slender with large erect appendages, exothecial cells often longer than wide. Pollen tricolpate, surface nearly smooth. Style branches elongate, blunt; slightly enlarged

1 The authors wish to thank Drs. Jose Cuatrecasas and Lloyd H. Shinners for their numerous helpful suggestions.

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at the tips, cells of the surface only slightly bulging, basal node of style glabrous. Pappus in a single series, 2-3 long scabrate setae and 3-4 short squamae with lacerate margins. Achenes 5 ribbed, ribs setose, sub-cuticular cells of ribs and lateral walls with many minute punctations; carpopodium somewhat flaring, with many rows of short or transversely elongate cells; basal foramen prominent, with an even margin.

There are seven species which agree in most of these characters with Hofmeisteria fasciculata. These fall into three groups. The first group consists of the species H. crassifolia S. Wats. and H. filifolia Johnston. These are characterized by rather fleshy leaves with narrow to filiform segments. In both species the pappus is differentiated into 3-5 long setose members and intervening groups of short setae. The intervening setae of H. filifolia tend to be very short. These setae, though separate to the base, are the equivalent of the squamose members of H. fasciculata.

Hofmeisteria filifolia is unlike any of the other seven species of Hofmeisteria recognized here in the variation of phyllotaxy and inflorescence. Clustering of the leaves at the flowering nodes tends to be less evident and the peduncles tend to be apical and often bear larger leaves than are typical for the genus. In spite of these differences, the species closely agree with others of Hofmeisteria in the basic characters: pollen, glabrous corolla tube; and the cellular structure of the acene.

The second group of species can be characterized by the thin lamina of the leaves and appendages of the anthers being folded over and superficially appearing absent. Podophania dissecta has been placed in the subtribe Piquerinae because of the supposed lack of appendages on the anthers. Microscopic examination reveals appendages as large as those of other species of Hofmeisteria. The appendages, however, are folded over to form a hood on the end of the anther. Podophania also differs from typical Hofmeisteria by the possession of about 12-15 setose pappus bristles of rather uniform length. In view of the variations in pappus structure already evident in the genus Hofmeisteria, we propose the following new combination:

Hofmeisteria dissecta (Hook. and Arn.) R. M. King and H. Robinson Comb. nov. (Phania dissecta Hook. and Arn. Bot. Beech. Voy. 433. 1841). Hooker & Arnott compared P. dissecta with their P. (Hofmeisteria) urenifolia, and while

noting the pappus difference, state it was "doubtless a congener." Rose (1895) also remarked on the resemblance of Podophania to Hofmeisteria.

Hofmeisteria sinaloensis Gentry very closely resembles H. dissecta in the texture of its leaves. Although not mentioned in Gentry's original description, H. sinaloensis also possesses the cucullate appendage on the anther. It differs from H. dissecta clearly by the pappus which is differentiated into 5 or 6 long setae members with intervening short, very lacerate squamae.

The third group of species showing the essential characters of the genus Hofmeisteria can be characterized by the pappus consisting of 5-6 long setae with only vestigial intervening members, and leaves with thin laminae. Here may be found H. urenifolia (Hook.& Arn) Walpers which had originally been placed in the genus Hofmeisteria by Walpers. In spite of the difference in pappus structure we feel that the proper position of this species is in Hofmeisteria rather than in Fleischmannia where it has more recently resided.

Hofmeisteria schaffneri (A. Gray) R. M. King and H. Robinson, comb. nov. (Fleischmannia schaffneri A. Gray, Proc. Am. Acad. 41: 101, 1881) is closely related to H. urenifolia differing primarily by the densely glandular pubescent stem. The leaves in H. schaffneri tend to be more dissected than in H. urenifolia.

Hofmeisteria standleyi (Blake) R. M. King and H. Robinson; comb. nov. (Fleischmannia standleyi Blake, Contr. U. S. Nat. Herb. 22: 590, 1924) also differs from H. urenifolia by densely glandular pubescent stems, but has leaves only lobed and dentate, not dissected.

As thus conceived Hofmeisteria includes a great range of variation in pappus structure. When compared with the following groups with which the species of Hofmeisteria have been confused, numerous other characters are available to support the present concept.

Fleischmannia Sch. Bip. has been characterized by a pappus consisting of a reduced number of setae, usually 5 or 10. The three species remaining in the genus are F. arguta (H.B.K.) Rob. (= F. rhodostylis Sch. Bip. type species) F. microcephala

Brandg. and F. repens Rob. These are a heterogeneous assemblage of species which, however, share a number of basic characters that contrast with those of Hofmeisteria, and the three species may prove to be a natural group. In this group the leaves are all simple, spirally arranged or opposite; the flowering nodes and peduncles are not strongly differentiated; the inflorescense is polycephalic; the corolla tube bears hairs on the upper portion (these are very highly developed in F. repens); the pollen is distinctly spinose; the carpopodium is rounded to only slightly flaring and consists in part of vertically elongate cells. Within the genus as presently understood there remain such variations as pappus consisting of about 10 setae in F. microcephala as compared with 5 in the other two species; corolla much inflated in the upper portion, very narrow below in F. repens as opposed to narrowly tubular in the other two species; anther sacs very elongate in F. arguta as opposed to to shorter sacs in F. repens and very short sacs in F. microcephala; cells of the carpopodium rather thin walled in F. repens as opposed to very thick walled in the other two species.

The genus Malperia S. Wats. resembles Hofmeisteria by the presence of a pappus differentiated into long setae and short squamae. It differs most noticeably by having sessile linear sub-entire leaves. In addition to this, it can be noted that the leaves are not clustered at the flowering nodes, and the peduncles are not strongly differentiated; the inflorescense is polycephalic; the corolla tube bears glandular hairs; the pollen is distinctly spinose; the carpopodium has a very large foramen, and is often strongly asymmetric; the cells of the carpopodium are relatively short vertically. In its various characters Malperia shows much greater similarity to the genus Stevia than to Hofmeisteria.

There remain three species which have been placed in the genus Hofmeisteria which do not resemble any of the previously discussed genera. For these species we propose the following new genus:

Pleurocoronis R. M. King and H. Robinson genus novum (Compositarum-Eupatorieae-Eupatoriinae) Folia inferiora opposita; alia subopposita vel alterna, capitula homogama discoidea; flores omnes hermaphroditi, fertiles, regulares. Antherae cum appendice apicali. Achaenia 5 angulata, faciebus lateralibus dense hirsutis. Pappus mixtus interdum biseriatus.

Woody sub-shrub. Leaves simple to compound, petiolate,

serrate, opposite in lower portions of plant becoming alternate above. Peduncles not strongly differentiated, bearing alternate leaves. Inflorescence polycephalic. Heads many flowered. Phyllaries in multiple series, outer one short ovate, inner lanceolate. Corolla slender, tubular with glandular hairs on the outer surface. Anthers elongate with large erect appendages, exothecial cells iso-diametric or slightly wider than long. Pollen tricolpate, distinctly spinose. Style branches elongate, slightly enlarged at the tip, cells at the surface slightly bulging; basal node of style glabrous. Pappus of 3-6 long scrabrate setae with intervening short erosely dentate squamae, sometimes bearing numerous additional setae in a distinct inner series. Achenes 5 ribbed, lateral surfaces densely pubescent, sub-cuticular cells without minute punctations except on the ribs; carpopodium somewhat rounded, usually asymmetric, cells vertically elongate; basal foramen shallow, indistinct.

Pleurocoronis pluriseta (Gray) R. M. King and H. Robinson comb. nov. Type species (Hofmeisteria pluriseta Gray Pacif. Rail. Rep. 4: 96, 1857).

The only significant character shared by Pleurocoronis and Hofmeisteria is the similar form of the pappus. A review of numerous other characters both macroscopic and microscopic indicates there is no close relationship between these two genera. The phyllotaxy is different; Hofmeisteria is monocephalic while Pleurocoronis is polycephalic; the pubescence of the corolla is different; the pollen is different; and the structure of the achene is very different. Pleurocoronis is particularly distinct in the structure of the achene, differing from most genera of the Eupatorieae which we have seen, in the combination of dense pubescence on the lateral walls and the lack of minute punctations. These characters do occur again in the genus Brickellia. It is possible that Pleurocoronis and Brickellia are closely related, but Brickellia is easily distinguished by 10 ribbed achenes and carpopodia with shorter cells and a large even-margined foramen. [4]

[4] In Brickellia we have noticed a further possibly significant distinguishing character regarding the node which occurs at the base of the style which is often enlarged to close the lower end of the corolla tube. In Pleurocoronis and in all other genera we have seen, the stylar node is glabrous. In the species of Brickellia we have seen, the stylar node is densely covered with setae.

A second species of the genus, Pleurocoronis laphamioides (Rose) R. M. King and H. Robinson comb. nov. (Hofmeisteria laphamioides Rose, Contr. U. S. Nat. Herb. 1: 79, 1890), is distinguished from P. pluriseta by the deltoid to reniform lamina with 15 or more marginal teeth. In P. pluriseta the the lamina of the leaves is small, narrowly ovate with usually five or less teeth.

Pleurocoronis gentryi (Wiggins) R. M. King and H. Robinson, comb. nov. (Hofmeisteria gentryi Wiggins, Contr. Dudley Herb. 4: 25. 1950) is easily distinguished from the other two species by its dissected leaves.

The genera of the Hofmeisteria complex as presently recognized can be distinguished by the following key:

1. a. Inflorescence monocephalic; corolla glabrous; pollen nearly smooth; leaves usually clustered at flowering nodes----------Hofmeisteria.

   b. Inflorescence polycephalic; corolla with hairs or glands externally, at least on the lobes; pollen spinose; leaves not clustered at flowering nodes----------2.

2. a. Pappus of 5-10 setose members in a single series, without squamose members, corolla with nonglandular hairs in the upper part----------Fleischmannia.

   b. Pappus in one or two series, of three or more setose members with intervening or subtending squamose members; corolla with numerous glandular hairs---3.

3. a. Lateral surfaces of the achene covered with dense pubescence; pappus in one or two series, squamose members often subtending some of the setose members; leaves petiolate, often opposite in the lower portions of the plant----------Pleurocoronis.

   b. Setae restricted to the ridges of the achene; pappus members in a single series, squamae only overlapping the setose members; leaves sessile, rarely opposite----------Malperia.

Since some of the characters involved in this study have not been previously used in delimiting Composite genera, and since

some of the traditional characters seem misleading, the following comments are offered. These comments are admittedly often based on limited observations of other tribes of the Compositae.

Corolla pubescence. In other genera of Compositae some variation in corolla pubescence has been observed. Still, we have frequently found it useful. Within the Hofmeisteria complex, corolla pubescence has proven consistent in all four genera. Three distinct types of corolla pubescence are found; corolla entirely glabrous as in all species of Hofmeisteria; corolla with non-glandular hairs above, as found in all three of the otherwise somewhat dissimilar species of Fleischmannia; and corolla with glandular hairs as found both in Malperia and Pleurocoronis.

Exothecial Cells of Anthers. We have noticed that the Eupatorieae as a group can frequently be distinguished from other tribes by the shape of the exothecial cells. In the Eupatorieae these cells are almost always isodiametric or slightly shorter than wide. Within the Eupatorieae, Hofmeisteria tends to be an exception. Although the character would be unreliable for the separation of the genus, the tendency for more elongate cells is sufficiently marked to have given us our first lead as to the close relationship between typical Hofmeisteria and so-called Fleishmannia urenifolia.

Appendages. The discovery of the true nature of the appendages of Hofmeisteria (Podophania) dissecta resolves the possible conflict regarding the value of the subtribe Piquerinae. It remains possible to consider this subtribe, characterized by its vestigial appendage, as probably a natural group.

Pollen. We have observed considerable variation in pollen ornamentation in other groups of Eupatorieae and these are not necessarily correlated with other characters. However, the pollen of Hofmeisteria is a degree smoother than any other we have observed in the Eupatorieae. In this pollen type Hofmeisteria is absolutely distinct from any of the other genera in the complex.

Pubescence of the Achene. The type of achene found in Pleurocoronis seems to be rather unusual in the Eupatorieae. The dense pubescence correlated with lack of punctations between the ribs is so completely distinct from the type found

| HOFMEISTERIA | MALPERIA | FLEISHMANNIA | PLEUROCORONIS |
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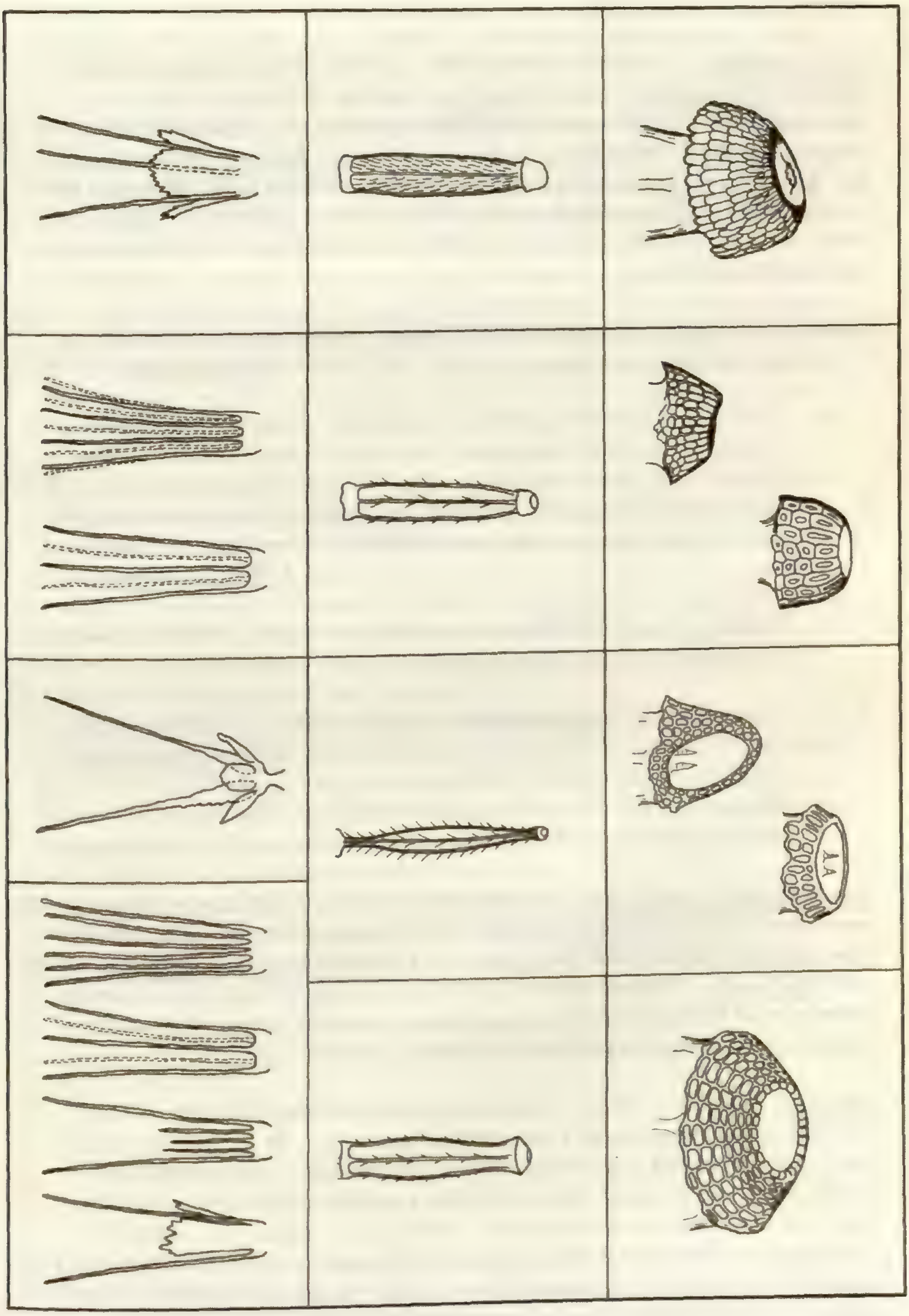
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in the other three genera of the complex that close relationship seems impossible.

Carpopodium. In other Composite groups particularly in the genera Gnaphalium, and Piqueria, useful differences in the carpopodium occur between various species. Whatever the value of such differences in other groups, the four genera of the Hofmeisteria complex each shows a distinct structure. It is possible to distinguish each of these four genera by the shape and cellular structure of the carpopodium as shown by the following key:

1. a. Foramen of carpopodium wide, often born laterally Malperia.

   b. Foramen of carpopodium smaller, sometimes hardly evident, never lateral----------2.

2. a. Cells of carpopodium short vertically, in many tiers, sometimes appearing transversely elongate---------- Hofmeisteria.

   b. Cells of carpopodium vertically elongate, base usually rounded or bud-like----------3.

3. a. Foramen of carpopodium distinct with a clean margin Fleischmannia.

   b. Basal cavity or carpopodium shallow, foramen indistinct without evident margin----------Pleurocoronis.

Chromosome numbers. Apparently unpublished counts have been seen for chromosome numbers of three species representing one species in each of the genera, Hofmeisteria, Pleurocoronis, and Malperia. These three numbers are different, but further counts will be necessary to indicate whether these different numbers are characteristic of their genera.

Pappus. Perhaps there is no structure more utilized in the the characterization of Compositae genera. It is interesting to note that whereas all other characters used in this study are in general agreement that only the pappus structure seems to conflict with the above generic concepts. While the other characters are not in themselves necessarily more reliable, the general agreement between them leads to an irrefutable conclusion. In the Hofmeisteria complex the pappus structure is

totally unreliable above the species level. A number of recent studies in other Composite groups have also questioned the value of the pappus as a generic character (Shinners, 1946, 1947; DeJong, 1965).

In spite of frequent reference to pappus consisting of two series in Hofmeisteria, this situation actually occurs only in the Pleurocoronis element. Even here, the inner series is sometimes lacking. The setose and squamose members are apparently often considered to be in separate rows, but actually the setose members are located in the same series as the squamose members in gaps above the ribs of the achene. The squamose members often broaden above the base and overlap the setose members. In Pleurocoronis additional setose members are often present, located inside of uninterrupted squamae.

It is interesting to observe the variation of pappus structure within the genus Hofmeisteria. Here variation may be seen from well developed squamae to a series of distinct filamentous structures which in one species are essentially equal to the setose members in size. In the H. urenifolia group the squamose members are vestigial or completely lacking. This type of variation has been recognized to some extent in the previous concepts of the genus.

Conclusions: After reviewing a broad spectrum of characters, it is obvious that these genera which resemble each other in little but pappus structure are not closely related. In view of the number of consistent differences, relationships between the genera are possibly rather remote. The genus Hofmeisteria seems particularly distinctive and perhaps future reorganization of the Eupatoriae will reflect this.

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## A NEW VARIETY OF PENSTEMON

Ralph W. Bennett

In Phytologia, Volume 9, Number 2, pp. 57--58, 1963, certain nomenclatural changes and new varieties were published. The following new variety is published herewith:

Penstemon Mitch.

P. hirsutus Willdenow

var. minimus Bennett, var. nov.

A var. hirsuti differt: caulibus non altior quam 10 cm.

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## NOTES ON NEW AND NOTEWORTHY PLANTS. XLII

Harold N. Moldenke

ALOYSIA BARBATA var. ACAPULCENSIS Moldenke, var. nov.

Haec varietas a forma typica speciei foliis ellipticis usque 11.5 cm. longis 4.5 cm. latis subtus minute puberulis resinoso-punctatisque recedit.

This variety differs from the typical form of the species in having its leaf-blades elliptic, to 11.5 cm. long, 4.5 cm. wide, and minutely puberulent and resinous-punctate beneath.

The type of the variety was collected by Ladislao Paray (no. 2666) at Puerto Matqués, near Acapulco, Guerrero, Mexico, on December 23, 1957, and is deposited in the herbarium of the Escuela Nacional de Ciencias Biologicas, Instituto Politechnico Nacional, in Mexico City.

CLERODENDRUM INTERMEDIUM f. ALBIFLORUM Moldenke, f. nov.

Haec forma a forma typica speciei corollis albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Francesco Fuerrero at Arayat, Panpanga Province, Luzon, Philippine Islands, in 1927, and is deposited in the herbarium of the University of California at Berkeley.

CLERODENDRUM LINDLEYI f. ALBIFLORUM Moldenke, f. nov.

Haec forma a forma typica speciei corollis albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Tsiang Ying (no. 1433) in open scrub on the way to Sie-kun, Lokchong Hsien, in the North

River region, Kwangtung, China, on October 23, 1928, and is deposited in the herbarium of the University of California at Berkeley.

CLERODENDRUM PANICULATUM f. ALBIFLORUM Moldenke, f. nov.

Haec forma a forma typica speciei corollis albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Roy White Squires (no. 363) on rocky hillsides in underbrush near the river Quaeng Tri, at Hue, Annam, Indochina, on April 20, 1927, and is deposited in the herbarium of the University of California at Berkeley.

DASIPHORA FRUTICOSA f. VILLOSISSIMA (Fern.) Moldenke, comb. nov.

Potentilla fruticosa f. villosissima Fern., Rhodora 37: 292, pl. 367. 1935.

DOELLINGERIA UMBELLATA f. INTERCEDENS (Fern.) Moldenke, comb. nov.

Aster umbellata f. intercedens Fern., Rhodora 51: 102. 1949.

EPILOBIUM HORNEMANNI f. ALBIFLORUM Moldenke, f. nov.

Haec forma a forma typica speciei corollis albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by my son, Andrew Ralph Moldenke (no. 1098), in a wet marshland, Cap au Renard, Gaspé Peninsula, Québec, Canada, on August 30, 1965, and is deposited in the herbarium of the Botanisk Institut, Aarhus University, Aarhus, Denmark.

EUTHAMIA GRAMINIFOLIA var. MAJOR (Michx.) Moldenke, comb. nov.

Solidago lanceolata α major Michx., Fl. Bor.-Am. 2: 116. 1803.

LIPPIA RZEDOWSKII Moldenke, sp. nov.

Frutex; ramis ramulisque gracillimis dense strigillosis cinereis; foliis parvis ellipticis densissime crenulatis utrinque densissime cinereo-tomentellis; inflorescentiis terminalibus racemosis densissime cinereo-tomentellis, capitulis verticillatis brevissime pedunculatis densissime lanato-tomentellis.

Shrub; branches and branchlets very slender, densely grayish-strigillose, the larger ones more or less glabrescent in age; principal internodes 3--4 cm. long; leaves small, decussate-opposite; petioles very short, 1--3 mm. long, very densely gray-pilose; leaf-blades firmly chartaceous, narrow-elliptic, 1--3.2 cm. long, 7--15 mm. wide, acute at the apex, very densely and uniformly crenulate along the margins from the base to the apex, obtuse or rounded at the base, very densely gray-tomentellous on both surfaces; midrib and the 3 or 4 very slender ascending secondaries somewhat impressed above and prominulent beneath; in-

florescence terminal, in elongate loose racemes 14.5—20 cm. long, with 4—7 widely separated whorls of flower-heads (1—4 heads per whorl), each whorl subtended by a pair of linear-lanceolate densely white-tomentellous bractlets 3—6 mm. long or the lowest whorl subtended by leaf-like bracts; peduncles very slender, about 5 mm. long, densely white-tomentellous; heads subglobose, 5-6 mm. long and wide, densely many-flowered, very densely white-lanate-tomentose, the floral bractlets hidden by the tomentum; corolla hypocrateriform, only very slightly surpassing the bractlets, densely pubescent on the outside, the limb about 2 mm. wide.

The type of this species was collected by Jerzy Rzedowski (no. 17635) — in whose honor it is named — 1 km. north of San Francisco, municipality of Valparaiso, Zacatecas, Mexico, at an altitude of 1800 meters, on November 3, 1963, and is deposited in the herbarium of the Escuela Nacional de Ciencias Biologicas, Instituto Politecnico Nacional, in Mexico City.

PERSICARIA LAPATHIFOLIA var. PROSTRATA (Wimm.) Moldenke, comb. nov.

Polygonum lapathifolium δ prostratum Wimm., Fl. Schles. 220. 1857.

PERSICARIA SCABRA (Moench) Moldenke, comb. nov.

Polygonum scabrum Moench, Meth. 629. 1794.

VERBENA MULTIGLANDULOSA Moldenke, sp. nov.

Herba per omnes partes dense glanduloso-hirtellis; caulis numerosis rosulatis ad basin dense foliosis; foliis parvis multipartitis; pedunculis elongatis erectis stramineis; inflorescentiis capitatis vel subcapitatis multifloris; bracteolis anguste lanceolatis attenuatis calycem dimidio brevioribus; corollis magnis bellis.

Perennial herb, densely glandular-hirtellous throughout; stems many, rosulate, decumbent or procumbent and very leafy toward the base, ascending or erect toward the apex and there only sparsely leafy, stramineous, terete, densely glandular-hirtellous; lower internodes abbreviated, 1—2 cm. long, upper ones elongated to 4.5 cm.; leaves decussate-opposite, crowded toward the base of the stems, distant above, sessile or subsessile, 1—1.5 cm. long and wide, deeply many-parted, densely glandular-hirtellous on both surfaces, gray-green on both surfaces, the lobes linear-oblong, obtuse at the apex; peduncles slender, stramineous and densely glandular-hirtellous like the stems and confluent with them, 4—9 cm. long, terete; inflorescence terminal, showy, capitate or subcapitate, densely many-flowered; bractlets lanceolate, about half as long as the calyx or slightly more than half as long, gradually attenuate to the sharply acute or subacuminate apex, densely glandular-hirtellous; calyx tubular, about 6 mm. long and 2 mm. wide, densely glandular-hirtellous, the rim irregularly and shortly 5-toothed, the teeth narrowly lanceolate, erect, and attenuate-tipped; corolla hypocrateriform, showy, the tube narrow-cylindric,

about 12 mm. long, the limb about 8 mm. wide.

The type of this species was collected by C. Marticorena and O. Matthei (no. 315) at Arqueros, Coquimbo, Chile, on October 16, 1963, and is deposited in my personal herbarium at Plainfield, New Jersey.

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# MATERIALS TOWARD A MONOGRAPH OF THE GENUS LIPPIA. VIII

Harold N. Moldenke

LIPPIA SCAPOSA Briq.

Additional bibliography: Moldenke, Phytologia 12: 462--464. 1965.

In all, 8 herbarium specimens, including type material, and 4 mounted photographs have been examined by me.

Citations: PARAGUAY: Hassler 6965 [Macbride photos 17542] (Ca--944349--isotype, It--photo of isotype, Kr--photo of isotype, Mi--isotype, N--isotype, N--isotype, N--photo of isotype, S--isotype, W--photo of isotype); Jorgensen 4583 [Herb. Osten 22251] (Du--206337, N, Ug).

LIPPIA SCAPOSA var. MELANOCAULOS Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1163. 1903.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1163. 1904; Briq. in Chod. & Hassler, Pl. Hassler. 2 (11): 499. 1904; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 96 (1942) and [ed. 2], 99 & 191. 1949; Moldenke, Résumé 117 & 462. 1959; Troncoso, Darwiniana 12: 289. 1961.

This variety differs from the typical form of the species in having black (instead of green) stems, which are apparently more fistulose above, and the bractlets sometimes broader, large and ovate.

The type of the variety was collected by Emil Hassler (no. 6965a) in the region of the upper course of the Río Y-acá, Paraguay, in January, 1900, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. Troncoso (1961) is of the opinion -- without having seen any material -- that this probably represents the pistillate form of L. scaposa Briq., rather than a distinct variety. I have seen no material, either, and know nothing of the taxon except what is stated in the literature.

LIPPIA SCHAUERIANA Mart. ex Schau. in A. DC., Prodr. 11: 590. 1847.

Bibliography: Schau. in A. DC., Prodr. 11: 590. 1847; Schau. in Mart., Fl. Bras. 9: 246. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; Moldenke, Known Geogr. Distrib. Verbenac.,

[ed. 1], 37 & 96. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 81. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 191. 1949; Moldenke, Alph. List Cit. 3: 710. 1949; Moldenke, Phytologia 3: 287. 1950; Moldenke, Résumé 94 & 462. 1959; Moldenke, Phytologia 12: 24. 1965.

Shrubby, branched; branches tetragonal, glandular-scabrid; leaves decussate-opposite or approximate, patulous, petiolate; petioles glandular-scabrid; leaf-blades broadly ovate, about 2.5 cm. long, about 1.8 cm. wide near the base, acute at the apex, serrate and subrevolute along the margins, subferrugineous (perhaps only in drying) beneath, rough and shiny above, paler beneath, very slightly pubescent and glandular-pulverulent beneath, 3-veined, the midrib pinnately branched, venose; heads very short-pedunculate, finally subspicate, solitary in the leaf-axils, rather corymbose at the apex of the branchlets; bractlets herbaceous, ovate-elliptic, obtuse at the apex, 3-veined, glandular-pubescent; calyx bifid, villous, the lobes obtuse at the apex; corolla hypocrateriform, white or pale-rose, its tube 6 mm. long, cylindric, somewhat gradually ampliate above and puberulous there, the limb somewhat broader, thin, undulate.

The type of this apparently rare species was collected by Carl Friedrich Philipp von Martius (no. 243) in pastures along the Rio São Francisco between Bom Jardim and Cruz de Valerio, Pernambuco, Brazil, flowering in April, deposited in the herbarium of the Botanical Museum at Munich, where it was photographed by Macbride as his type photograph number 20334. It is named in honor of Johann Conrad Schauer, who monographed the Verbenaceae over a hundred years ago. Schauer (1847) places the species in his Section Zapania, Subsection Corymbosae. In all, 2 herbarium specimens and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Bahia: Löfgren 941 [Herb. Rio de Janeiro 46787] (Ja, N). Pernambuco: Martius 243 [Macbride photos 20334] (It—photo of type, Kr--photo of type, N—photo of type, W—photo of type).

LIPPIA SCHLECHTENDALII Moldenke, Phytologia 2: 53. 1941.

Synonymy: Dipterocalyx scaberrima Schlecht., Linnaea 26: 647. 1853 [not Lippia scaberrima Sond., 1850].

Bibliography: Sond., Linnaea 23: 87. 1850; Schlecht., Linnaea 26: 647. 1853; Moldenke, Phytologia 2: 53. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32 & 96. 1942; Moldenke, Alph. List Invalid Names 23. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 81. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 63 & 191. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 71, 278, & 462. 1959; Moldenke, Résumé Suppl. 12: 3. 1965.

Small shrub, 2.6—3.3 m. tall, very rough throughout; petioles about 2.5 cm. long; leaf-blades ovate, long-acuminate at the apex, densely crenulate-serrate along the margins, rather acute at the base, densely rugose above, softer beneath, the entire vein reticulation pilose-hirtous and prominulous beneath, the midrib rarely

also hirtous above; inflorescence axillary, whorled, pedunculate, forming a rather broad terminal panicle; heads 6 mm. wide; bractlets imbricate in many ranks, narrowly obovate-rounded, small, very obtuse and white-hispid at the apex; calyx compressed, slightly over 2 mm. long, bicarinate, with 2 compressed teeth on the margin of the keel-prolongations about a third the length of the calyx, long-pilose with white hairs; corolla white, the tube slightly less than 2 mm. long, gradually ampliate upwards, equaling the calyx-teeth, the limb hirtous on the outer surface; style very short, somewhat thicker and bilobed at the apex, persistent on the fruit; fruit black, broadly ovate, smooth, glabrous, easily separable, compressed, the sides convex, with a longitudinal sulcation, the margin obtuse, terminating in a minute apiculation which is the persistent style.

The type of this puzzling species was collected by Wagener (no. 426) in dry places at Chacaito, near Caracas, Federal District, Venezuela [as "Colombia" in the original description], at an altitude of 4000 feet, flowering and fruiting in November. It is named in honor of Diederich Franz Leonhard von Schlechtendal, German botanist of distinction, professor of botany and director of the botanical garden at Halle, author with Chamisso of many important botanical papers. He says "Dipterocalyx genus olim a Chamissone constitutum a beato Schauero cum Lippia conjunctum, nostra sentenia restituendem."

Nothing is known to me about this plant except what is given about it in the original description.

LIPPIA SCHLIEBENI Moldenke, Phytologia 2: 316—317. 1947.

Synonymy: Lantana schliebeni Moldenke, Résumé 307, in syn. 1959.

Bibliography: Moldenke, Phytologia 2: 316—317 & 341. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 117, 118, & 191. 1949; Moldenke, Alph. List Cit. 3: 723, 815, & 903 (1949) and 4: 1046, 1060, & 1248. 1949; Moldenke, Phytologia 3: 456. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 142, 145, 146, 307, 418, & 462. 1959.

Dense bush or much-branched shrub or subshrub, 1—3 m. tall; stems and branches gray, obtusely tetragonal, scabrellous; twigs tetragonal, short-pubescent or puberulent, brownish; nodes not annulate; leaf-scars elevated, corky; principal internodes 2—15 mm. long on twigs, to 5 cm. long on the main stem; leaves decussate-opposite, numerous, aromatic with a strong scent of camphor when crushed; petioles slender, 1—6 mm. long, densely puberulent; leaf-blades chartaceous, bright-green above, lighter beneath, ovate, 1.5—3 cm. long, 5—15 mm. wide, acute at the apex, densely serrulate along the margins, acuminate at the base, scabrous and bullate above, appressed canescent-puberulous beneath; midrib slender, deeply impressed above, promimulent beneath; secondaries slender, 3—5 per side, ascending, not much arcuate, deeply impressed above, promimulent beneath; vein and veinlet reticulation beautifully conspicuous and deeply impressed above, promimulent

beneath; inflorescence axillary, abundant, spicate, 2 per node; peduncles slender, 2--6 cm. long, densely puberulent, glabrescent in age; spikes subcapitate during anthesis, elongate to 2 cm. in fruit, densely many-flowered; bractlets ovate, numerous, reflexed during anthesis, about 5 mm. long and 3 mm. wide, attenuate at the apex, densely puberulent on both surfaces; flowers very fragrant; corolla hypocrateriform, white or whitish-yellow to yellowish-white, bluish, or rose-color, surpassing the subtending bractlet by about 3 mm., densely pubescent on the outer surface, its limb about 3 mm. wide; fruit dry, lilac.

The type of this species was collected by H. J. Schlieben (no. 5596) -- in whose honor it was named -- at Mucra Plateau, Bakari, 80 km. west of Lindi, at an altitude of 600 m., Tanganyika, on October 26, 1934, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The species has been found in fields, hedges, bush grasslands, and on dry grassy hillsides, at altitudes of 560 to 2665 meters, flowering from December to August and in October, in fruit in February, March, and July. A vernacular name recorded for it is "igahia". Schlieben calls it "very common", while Greenway says that it is "locally dominant in Vernonia-Clerodendrum bush formation in abandoned Manihot rubber plantations".

The flowers are described as "white" on Dümmer 5142, Fries & Fries 159, Graham 2141, Greenway 3116, and A. Peter 31336, 41351, & 43365; "whitish-yellow" on Fries & Fries 443 and Schlieben 4548; "yellowish-white" on A. Peter 42581; and "white, bluish, or rose-color" on A. Peter 4031. The fruit (!) is described as "lilac" in color on A. Peter 39075. The leaves are especially scabrous on A. Peter 1496, 2056, 2119b, 8562, 31336, 42452, 42581, 42861, 43360, & 43365.

Material has been misidentified and distributed in herbaria under the names L. adoensis Hochst., L. asperifolia Rich., L. plicata J. G. Baker, L. ukambensis Vatke, L. viburnoides Vahl, and Lantana salviifolia Jacq.

The species seems superficially, at least, to resemble greatly Lantana scabrifolia Moldenke, and I am not convinced that these two taxa are distinct. More material is needed to clarify this question.

In all, 42 herbarium specimens, including the types of both names involved, and 4 mounted photographs have been examined by me.

Citations: CONGO LEOPOLDVILLE: Quarré 3448 (Br, Br, Br, Br, Br, N). TANGANYIKA: P. J. Greenway 3116 (K); Grote s.n. [2.I. 1913; A. Peter 51812] (B); A. Peter 497 [0.I.18] (B), 1496 [0.I. 37] (B), 2056 [0.I.53] (B, B), 2119b [0.I.54] (B), 4031 [0.I.119] (B), 4263a [0.I.128] (B), 8562 [0.III.43] (B), 11244 [I.III.121] (B), 16430 [0.IV.46] (B), 17145a [0.IV.76.I] (B), 31336 [V.47] (B), 39075 [V.191] (B), 41351 [V.263] (B), 42452 [V.287] (B), 42581 [V.292] (B), 42861 [V.299] (B, B), 43360 [V.306] (B), 43365

[V.306] (B); Schlieben 4548 (S), 5596 (Br--type, K--photo of type, N--isotype, N--photo of type, Si--photo of type, Z--photo of type). KENYA: Dümmer 5142 (K, W--1094572); Fries & Fries 159 (K, N, S), 443 (N, S); M. D. Graham 2141 (K); Mearns 1838 (W--631790); Napier 2486 (K); Piemeisel & Kephart 186 (W--1373248).

LIPPIA SCHLIMII Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863.

Synonymy: Lippia schlimi Turcz. ex Moldenke, Résumé Suppl. 12: 11, in syn. 1965.

Bibliography: Turcz., Bull. Soc. Nat. Mosc. 36 (2): 204. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 31 & 96. 1942; Moldenke, Alph. List Invalid Names 30. 1942; Moldenke, Bot. Gaz. 106: 162. 1944; Moldenke, Alph. List Cit. 1: 135 (1946) and 2: 611. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 81. 1948; Moldenke, Alph. List Cit. 3: 693, 806, & 903 (1949) and 4: 1077 & 1078. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 60 & 191. 1949; Moldenke, Résumé 67, 312, & 462. 1959; Moldenke, Résumé Suppl. 11: 4, 5, & 7 (1964) and 12: 2, 3, 10, & 11. 1965; Moldenke, Phytologia 12: 207 & 292. 1965; Moldenke, Biol. Abstr. 46: 3616. 1965.

Shrubby; stems tetragonal, scabrous above with short hairs; leaves decussate-opposite, petiolate; petioles scabrous with short hairs; leaf-blades broadly lanceolate or ovate-lanceolate, acute or acuminate at the apex, crenate along the margins from about the middle to the apex, acute at the base, rugose-bullate and scabrous above, rather densely pubescent beneath; panicle terminal, many times trichotomous; heads mostly ternate, ovate, shorter than the peduncles; bractlets subsquarrose, acute at the apex; calyx densely ciliate on the back.

The type of this species was collected by Louis Joseph Schlim (no. 97) at Ocaña, Norte de Santander, Colombiam at an altitude of 4000 feet. An isotype in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva was photographed by Macbride as his type photograph number 24666. Turczaninow (1863) says "Capitulis etiamsi parva, tamen majora quam in praecedente [L. pauciserrata Turcz. = L. americana L.], pisi minoris magnitudine, minus squarrosa" and places the species in Section Zapania.

In several of my previous publications I regarded L. floribunda Briq. as a synonym of L. schlimii, with the same type, but this is incorrect. Briquet's name is based on Fendler 863 from Aragua, Venezuela, and belongs in the synonymy of L. moritzii Turcz. The Killip & Smith 19228 & 20285 and F. W. Pennell 8891, distributed as L. schlimii, are actually var. glabrescens (Moldenke) Moldenke.

In all, 5 herbarium specimens, including type material of all the names involved, and 4 mounted photographs have been examined by me.

Citations: COLOMBIA: Norte de Santander: Cuatrecasas, Schultes,

& Smith 12368 (W—1850956), 12381 (W—1850963), 12823 (W—1851035); Schlim 97 [Macbride photos 24666] (It—photo of type, Kr—photo of type, N—isotype, N—photo of isotype, W—photo of isotype). Santander: Killip & Smith 17053 (N).

LIPPIA SCHLIMII var. GLABRESCENS (Moldenke) Moldenke, Phytologia 10: 489. 1964.

Synonymy: Lippia venezuelana Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 234. 1900. Lippia venezolana Briq. apud H. Pittier, Cat. Fl. Venez. 2: 333, sphalm. 1947. Lippia hirsuta var. glabrescens Moldenke, Phytologia 9: 500. 1964. Lippia venezuelensis Briq. ex Moldenke, Résumé Suppl. 12: 11, in syn. 1965 [not L. venezuelensis Moldenke, 1939].

Bibliography: Briq., Ann. Conserv. & Jard. Bot. Genèv. 4: 234 & 238. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 32 & 96. 1942; Moldenke, Alph. List Cit. 1: 230. 1946; W. H. Hodge, Revist. Fac. Nat. Agron. 7: 313. 1947; Daniel, Verb. Cent. Antioq. 4. 1947; Moldenke, Alph. List Cit. 3: 663 & 693. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 63 & 191. 1949; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 289. 1950; Moldenke, Résumé 71, 318, & 463. 1959; Moldenke, Biol. Abstr. 45: 7026. 1964; Moldenke, Résumé Suppl. 11: 4, 5, & 7. 1964; Moldenke, Phytologia 9: 500 (1964), 10: 489 (1964), and 12: 207, 208, & 292. 1965; Moldenke, Biol. Abstr. 46: 3616. 1965; Moldenke, Résumé Suppl. 12: 2, 3, 10, & 11. 1965.

This variety differs from the typical form of the species in having its leaf-blades glabrous, subglabrous, or glabrescent beneath.

The type of the variety was collected by Ellsworth Paine Killip, Fred Alexander Barkley, and Brother Julián González Daniel (no. 39841) at the edge of a woods along the road from Medellin to Rionegro, at an altitude of 2000 meters, Antioquia, Colombia, on November 17, 1948, and is deposited in the Britton Herbarium at the New York Botanical Garden. The type of L. venezuelana was collected by Jean Jules Linden (no. 341) in the states of Trujillo and/or Mérida, Venezuela, in 1842, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva, where it was photographed by Macbride as his type photograph number 24677. The original label is inscribed "Hautes Andes de Truxillo & de Merida. Depuis 4000 jusqu'à 14,500 pieds de hauteur (1842)."

The plant is described by collectors as a shrub or tree, 3—16.5 m. tall, with spreading top, and good hard wood; leaves firmly membranous or membranous-chartaceous, pleasantly scented, deep-green above, dull-green beneath and with raised buff venation beneath; bracts and peduncles dull pale-green; flowers small; and corolla white or greenish-white.

The plant has been collected in woods and forests, thickets,

and rich woods near and bordering quebradas, on open hillsides, and at the edge of forests, at altitudes of 1700 to 3000 meters, flowering from November to March, as well as in June, July, and September, fruiting from January to March, June, July, and September. Steyermark refers to it as "common" in Táchira, while Gehriger found it in "pedregal y quebradas muy pendientes" in Mérida. Vernacular names reported for it are "gallinazo" and "salvia".

Daniel (1947) says "Otra forma semejante es Lippia venezuelana Briq. Arbusto también; sólo que el color grisáceo no aparece tan acentuado y las hojas son un poco más estrechas. También se le ve con cierta frecuencia." The L. venezuelensis Moldenke is a synonym of L. moritzii Turcz.

Material has been misidentified and distributed in herbaria under the names L. floribunda H.B.K., L. hirsuta L., L. hirsuta L. f., L. myriocephala Schlecht. & Cham., L. schlimii Turcz., and Hyptis sp. All the specimens cited by Hodge (1947) as L. hirsuta are actually L. schlimii var. glabrescens; his "Arcehr 267" is a typographic error for Archer 267.

In all, 32 herbarium specimens and 4 mounted photographs, including type or phototype material of all the names involved, have been examined by me.

Citations: COLOMBIA: Antioquia: Archer 267 (W--1541831), 1110 (W--1542347); Gutiérrez Villegas 1093 (N); Killip, Barkley, & Daniel 39841 (N--type); F. C. Lehmann 3137 (W--1323009); Toro 865 (N), 1281 (N). Caldas: F. W. Pennell 8891 (N, W--1142721), 8922 (N, W--1142729). Cauca: F. C. Lehmann 898 (W--939639); H. Pittier 1441 (W--531637); Triana 3684 (W--1481366). Cundinamarca: Triana 2043 (W--1481364). Norte de Santander: Killip & Smith 20285 (N). Santander: Killip & Smith 16982 (N, W--1352650), 19228 (N). Valle del Cauca: Cuatrecasas 20471 (F--1367447, N). VENEZUELA: Mérida: Gehriger 337 (N, N, Ve, W--1541246). Táchira: Steyermark 57271 (F--1205143, N, Ve--27292), 57469 (F--1205614, N, Ve--25271). Trujillo: Linden 341 [Macbride photos 24677] (It--photo, Kr--photo, N--photo, W--photo). CULTIVATED: Colombia: W. H. Hodge 6744 (N).

LIPPIA SCHOMBURGKIANA Schau. in A. DC., Prodr. 11: 577. 1847.

Synonymy: Lippia microphylla Benth. apud Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95, in syn. 1894 [not L. microphylla Cham., 1832, nor R. A. Phil., 1865]. Lippia schomburgkiana Schum. ex Moldenke, Résumé Suppl. 3: 33, in syn. 1962.

Bibliography: Benth. in Hook., Journ. Bot. 2: 52. 1840; Schau. in A. DC., Prodr. 11: 577. 1847; Schau. in Mart., Fl. Bras. 9: 227. 1881; Bocq., Adansonia 3: 244. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 95 & 96. 1894; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 33, 38, & 96. 1942; Moldenke, Alph. List Cit. 1: 223. 1946; H. N. & A. L. Moldenke, Pl. Life 2: 82.

1948; Moldenke, Castanea 13: 116--117. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 66, 81, & 191. 1949; Moldenke, Alph. List Cit. 3: 669, 689, 759, 905, 906, & 945. 1949; Moldenke, Bol. Soc. Venez. Cienc. Nat. 11: 289. 1950; Moldenke, Phytologia 4: 187. 1953; Moldenke, Résumé 75, 94, & 462. 1959; Moldenke, Résumé Suppl. 2: 9 (1960), 3: 33 (1962), 10: 2 (1964), and 11: 4. 1964; Moldenke, Phytologia 12: 23, 47, 170, 288, & 289. 1965.

Shrub, to 1.3 m. tall, erect, aromatic; stems brown, white-pilose; branches strict, short-twiggy; twigs sericeous-hirsutulous; leaves small, decussate-opposite, lavender-scented when crushed, short-petiolate; leaf-blades fairly dark-green, ovate-oblong, obtuse at the apex, crenulate along the margins, pinnately veined, plicate-rugose and more or less bullate above, holosericeous-tomentose above, white-hirtellous beneath, canescent; peduncles mostly paired in each leaf-axil, half as long as the subtending leaf; heads spicate, tetraquetrous-ovoid or oblong and distinctly 4-angled; bractlets pale-green, ovate, imbricate, acuminate at the apex with a folded-patulous acumen, half as long as the corolla-tube, the entire margin and keel white-villosulous from the first; flowers scented; corolla small, hypocrateriform, white or yellowish-white to pink, sometimes creamy-white with a yellow throat, about 3 mm. long, the upper and the very small lateral lobes of the limb reflexed, the lower lobe linear-oblong, extended forward, and truncate.

The type of this species was collected by Sir Robert Herman Schomburgk (no. 404) -- in whose honor it was named -- in British Guiana, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17543, but is now destroyed. Schauer (1847) classifies the species in her Section Goniostachyum and says that it is closely related to L. glandulosa Schau. It has likewise been compared with L. alba (Mill.) N. E. Br., but may be distinguished at once from that species by its oblong and distinctly 4-angled spikes, which are mostly paired in each leaf-axil, its much smaller bractlets and flowers, and its smaller more or less bullate leaves. Jackson (1894) lists a "Lippia microphylla Benth. in Hook., Journ. Bot. 2: 52. 1840" as a synonym of L. schomburgkiana, but Bentham in that reference clearly refers the binomial back to Cham., Linnaea 7: 226 (1832) and is certainly not intentionally proposing a homonym. Philippi's homonym is a synonym of Acantholippia deserticola (F. Phil.) Moldenke.

The species has been found on savannas, open savannas, campos, open grasslands, dry clay of rolling savannas, and caatinga, at altitudes of 3500 to 3600 feet, flowering from April to June, August, and October. Irwin reports it as "occasional" in fine brown sand on savannas. The only vernacular name recorded for it is "cidreira brava". The corollas are described as "white" on A. C. Smith 2193, "yellowish-white" on Irwin 402, "creamy-white with a yellow throat" on S. G. Harrison 1397, and "pink" on Irwin 728.

Material has been misidentified and distributed in herbaria as L. elegans Cham. and L. gracilis Schau.

In all, 32 herbarium specimens and 5 mounted photographs, including phototypes of the accepted name, have been examined by me.

Citations: VENEZUELA: Bolívar: Irwin 402 (W—2197626). BRITISH GUIANA: Forest Dept. Br. Guian. WB.79 (N, Wb); S. G. Harrison 1315 (N), 1397 (N); Irwin 549 (W—2212584), 728 (Au—165638); Jenman 52 (W—303498), 5501 (C, W—72937, W—1322977, W—1473158), 5644 (C, N); J. G. Myers 5535 (K); Rob. Schomburgk 75 (Br, Br, W-41336), 404 [Macbride photos 17543] (It—photo of type, Kr—photo of type, N—photo of type, N—photo of type, W—photo of type); A. C. Smith 2193 (N, S, W—1777570). BRAZIL: Brasilia: Murça Pires, Silva, & Souza 9095 (Z). Ceará: G. Gardner 1819 [Herb. Reichenb. f. 200257] (V, V); Guedes 447 (N, N); Löfgren 586 (S). Goiás: G. Gardner 4332 (V); Macedo 3639 (S, W—2059767). Pará: Fróes 29790 (Be—79757). Rio Branco: Black 51-12548 (N).

LIPPIA SCLEROPHYLLA Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1067—1068. 1904.

Synonymy: Lippia sclerophylla var. crenato-dentata Briq. in Cod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1068. 1904. Lippia sclerophylla var. subintegra Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1068. 1904. Lippia xerophylla Briq. ex Moldenke, List Invalid Names Suppl. 1: 16, in syn. 1947. Lippia sclerophylla var. sclerophylla [Troncoso], Darwiniana 12: 266, in nota. 1961.

Bibliography: Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1067—1068 & 1162. 1904; Briq. in Chod. & Hassler, Fl. Hassler. 2 (10): 489—490. 1904; Prain, Ind. Kew. Suppl. 3: 104. 1908; Molfino, Not. Bot. 2: 103. 1923; Moldenke, Lilloa 4: 428 (1940) and 8: 425—426. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41, 43, & 96. 1942; Moldenke, Alph. List Invalid Names 32. 1942; Moldenke, Lilloa 10: 380. 1944; Moldenke, Alph. List Cit. 1: 249 & 264. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 16. 1947; Moldenke, Phytologia 2: 386. 1947; Moldenke, Lilloa 14: 46. 1948; Moldenke, Alph. List Cit. 2: 441 & 600 (1948), 3: 660, 693, 747, & 862 (1949), and 4: 1165, 1238, 1256, & 1257. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99, 105, & 191. 1949; Moldenke, Résumé 117, 126, 317, 318, & 462. 1959; Troncoso, Darwiniana 12: 257 & 263—266, fig. 3 & 4. 1961; Moldenke, Phytologia 12: 24, 199, & 211. 1965; Moldenke, Résumé Suppl. 12: 11. 1965.

Illustrations: Troncoso, Darwiniana 12: 264 & 265, fig. 3 & 4. 1961.

Herb or subshrub, 0.5—2 m. tall, with mint odor; stems strict, furfuraceous with more or less antrorse strigose hairs; branches numerous, erect or ascending; internodes often shorter than the leaves; leaves ternate, sessile; leaf-blades ovate-elliptic or elliptic, 3.5—5.5 cm. long, 1.5—2.5 cm. wide, rath-

er shortly acute at the apex, regularly convex or sometimes recurved along the margins, varying from abundantly crenate-dentate to subentire or entire, rounded or rounded-attenuate at the base, rather shiny above, green and very rough above, sometimes scabridulous and paler beneath and densely glandular-pilosulous, pinnately veined; secondaries about 7, sometimes elevated, the lowest issuing in 3-plinerved fashion from the leaf-base; veinlet reticulation impressed above and prominulent beneath; peduncles obsolete or to 2 cm. long, canescent with close antrorse hairs, in the axils of the leaves or of ovate or ovate-elliptic leaf-like apical bracts; heads at first subglobose, later short-cylindric and pedunculate, to 1.5 cm. long, 6--7 mm. wide, corymbose at the apex of the branches, the corymbs forming a wide inflorescence; bractlets imbricate, broadly ovate, 3--4 mm. long, 2--2.5 mm. wide, acuminate at the apex, not at all squarrose, more or less covered with short antrorse hairs, short-ciliolate along the margins; calyx small, almost 2 mm. long during anthesis, the wings white-ciliate, the long hairs surpassing the bractlets on both sides, the remainder green, glabrescent, and covered with minute shiny glands, the 2 lobes subentire; corolla hypocrateriform, white or yellowish to blue, puberulent above, the tube exserted almost 3 mm. from the calyx-mouth, the lips small, rounded, the anterior one larger, the lobes almost 1 mm. long; stamens and pistil normal for the genus, included; fruit scarcely 2 mm. long and 1--1.5 mm. wide, pilosulous at the apex around the base of the style, otherwise smooth, bilocular, the cocci perfectly coherent.

This species was proposed by Briquet (1904) with two varieties: var. subintegra, based on a collection by Emil Hassler (no. 6919) from "in valle flum. Y-acá, in campis pr. Valenzuela" and described as "Folia.....integra, vel apicem versus obscure crenulata", and var. crenato-dentata (described as "Folia..... regulariter crebre crenato-dentata, dentibus extus rectiusculis vel convexiusculis, intus rectiusculis, culminibus prorsus versis 0,5--1 mm. altis et 1--2 mm. distantibus"), based on Hassler 1807 & 7903 -- for former from "in palude pr. Tucanguá, Jan." and the latter from "In campis et dumetis in regione superioris fl. Apa, XI.1901", all deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. The var. crenato-dentata is apparently regarded as the typical variety. From specimens of each of these collections which I have seen it would appear that the numbers were transposed somewhere along the line or else the material intergrades under each number. The material of 7903 certainly seems to represent his var. subintegra, while that of 6919 appears to represent very well var. crenato-dentata. I am arbitrarily designating Hassler 6919 as logotype of L. sclerophylla, the original having been photographed by Macbride in the Delessert Herbarium as his type photograph number 246677.

Briquet (1904) says: "Le L. sclerophylla appartient à la section Dipterocalyx où il se rapproche du L. hirta (Cham.) Schauer.

Dans ce dernier, les capitules sont disposés en racème simple et court; ici les capitules sont groupés en corymbes qui forment une vaste inflorescence. D'ailleurs, le port général, le mode de serrature des feuilles, les bractées acuminées au sommet (obtuses dans de L. hirta) etc. ne permettent pas de confondre les deux espèces. Quant au L. Hassleriana ci-dessus montionné, ses capitules sont disposés en grappes et non pas en corymbes; la forme de ses feuilles, des bractées coriaces, des corolles notablement plus grandes, etc., etc., permettent de lui attribuer des affinités beaucoup plus éloignées. L'apparence du L. sclerophylla rappelle celle des espèces du groupe Corymbosae de la section Euzapania."

In Lilloa 5: 425 the original page reference for L. sclerophylla is given as "1162" in error. In the Instituto Miguel Lillo the original publication for the species and its so-called varieties is given as "Plantae Hasslerianae X (1904) 489 & 490".

Troncoso (1961) classifies the species in her Subgenus Lippia, Section Dipterocalyx, along with L. hirta (Cham.) Meisn. and L. hassleriana Chod. She says "Briquet describe la especie en base a dos variedades, var. crenato-dentata y var. subintegra. Basa la primera en los sintipos Hassler 1807 y 7903 y la segunda en Hassler 6919. Moldenke (1942) establece la var. crenato-dentata como var. típica, pero sin indicar tipo. Hoy dia debe llamarse var. sclerophylla. Revisados los sintipos del Herbario de Ginebra, considero debe elegirse como lectotipo Hassler 1807, por ser el ejemplar que coincide más exactamente con la diagnosis original. En efecto, Briquet al describir el fruto dice: 'fructus apice circa styli basim pilosus, caeterum laevis.....', carácter que presenta Hassler 1807. En el otro ejemplar, Hassler 7903, la base del estilo, el ovario y el fruto son completamente glabros....Coincidentemente con este carácter, los ejemplares de estilo y ovario pubescente poseen cáliz algo más breve y sus lóbulos poco más largos en relación al tubo." She maintains var. subintegra as valid and comments "En esta variedad el ovario y fruto son glabros."

Dr. Raymond Weibel, in a letter to me dated June 4, 1951, makes the following comments about this species and Briquet's so-called varieties: "I have examined the specimens of Herb. Hassler (which is kept separately in our collections) and the duplicates which are in our general collection and which had been given by Hassler around 1900 to Herb. Delessert and to Herb. de Candolle.

"It does not seem that Briquet has accidentally transposed the numbers in his manuscript but I would rather think that the leaf serration is a very variable character which could not justify the existence of varieties; another explanation might be that Hassler made some errors while numbering his duplicates.

"1. Lippia sclerophylla var. crenato-dentata. For No. 1807 we have only a specimen from Herb. Hassler determined by Briquet

as Lippia sclerophylla v. crenato-dentata Briq. : leaves entire near the base to the inferior 1/4, for the rest crenate-dentate, the teeth acute and pointing upward (corresponding to Briquet's description); length of leaf limb ad 4,4 cm., width ad 2,3 cm.

"Hassler 1903 : 1st specimen in Herb. Hassler without determination in Briquet's handwriting : at the base of twig, the leaves are rather deeply crenate-dentate with obtuse teeth; near the tip of the twig the leaves are entire at the base, for the rest less deeply dentate with acute teeth. Length of limb ad 5,5 cm., width ad 2,3 cm.

"2nd specimen in Herb. Delessert with original label copied by Briquet and bearing in his handwriting: Lippia sclerophylla Briq. (no variety given). Leaves slightly crenate-dentate, teeth subacute. Length of limb ad 5,5 cm., width ad 1,9 cm.

"3rd specimen in Herb. de Candolle (no determination by Briquet). Some leaves are obtusely and slightly crenate-dentate, others are 'subintegra'. Length of limb ad 5,5 cm., width ad 2,8 cm.

"These three specimens have their limbs entire near the base.

"2. Lippia sclerophylla var. subintegra. 1st specimen from Herb. Hassler determined as Lippia sclerophylla Briq. sp. nov. v. subintegra by Briquet, has entire leaves, some of them are lightly denticulate near the tip; length (most of them) ad 3,5 cm., width ad 1,5 cm. One leaf only is longer than 4 cm. (it is broken) and 2 cm. wide.

"A second specimen from Herb. Hassler has not been determined by Briquet; its leaves are entire up to the lower half, obtusely and not deeply crenate-denticulate on the upper half; length ad 4,8 cm., width ad 1,9 cm.

"A third specimen in Herb. de Candolle has not been determined by Briquet and has been photographed by Macbride (No. 24.667). One branchlet is divided in 3 small twigs with leaves entire for the lower half of the limb; some are slightly and obtusely crenate-dentate for the upper half of the limb, others are subentire; length of leaves ad 4,7 cm., width ad 2,3 cm.; another separate twig bears leaves which are rather deeply crenate-dentate, the teeth subacute, length of leaves ad 3,3 cm., width ad 1,5 cm."

Lippia sclerophylla has been found on campos and dry campos, high rocky places, in thickets and ravines, in fields, and in fertile soil, at altitudes of 216 to 224 meters, flowering from November to April, fruiting in February. Jorgensen reports it as "common" on campos, while Montes describes it as "abundant" in high places on campos and matorales. A vernacular name recorded for it is "perfumada del campo". The flowers are described as "blue" on Montes 475, "yellowish" on Hassler 1807, and "white" on Anisits 2353, Hassler 7903, Jorgensen 4580, Montes 1815, Schulz 7128, and Schwarz 950, 1006, 1036, 2138, & 2216. Material has been misidentified and distributed in herbaria as L. hassleriana Chod.

In all, 66 herbarium specimens, including type material of all the names involved, and 4 mounted photographs have been examined

by me.

Citations: PARAGUAY: Anisits 2353 (S), 2750 (S, S); Hassler 6919 [Macbride photos 24667] (Ca--944352--logotype, It--photo of logotype, Kr--photo of logotype, Mi--logotype, N--logotype, N--logotype, N--photo of logotype, S--logotype, S--logotype, W--photo of logotype), 7903 (Ca--944350, Mi, N, S), 8988a (N), 8988c (N), 12500 (Ca--929700, Go, N, S, W--1057396); Jorgensen 4580 [Herb. Osten 22253] (Du--203302, La, N, N, S, Ug, W--1541007); Wunderlin 54 (Ca). ARGENTINA: Misiones: Bertoni 2626 (N); Ekman 1996 (Mi, N, S), 2036 (S); Grüner 69 (N); Lillieskold s.n. [vicinity of Colonia Bompland] (S); T. Meyer 6658 (Ut--74570), 11585 (N); Montes 368 (N, S), 475 (Ca, W--2058924), 732 (S, W--2049842), 896 (S, W--2049843), 1815 (N, Ug); D. Rodriguez 178 [Herb. Mus. Argent. Cienc. Nat. 23836; Herb. Inst. Miguel Lillo 32244] (Ca--3314, N, N, W--1802573, W--1858266); A. G. Schulz 7128 (Sz), 7181 (Z); G. J. Schwarz 535 (W--1933983), 670 (Ca), 691 (Ca), 950 (Ca, W--2049774), 1006 (N, S), 1036 (Ca), 1491 (Vi), 2138 (N), 2216 (N), 2579 (N).

LIPPIA SCLEROPHYLLA var. LORETENSIS Moldenke, Lilloa 5: 428. 1940.

Bibliography: Moldenke, Lilloa 5: 428. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 43 & 96. 1942; Moldenke, Alph. List Cit. 1: 249. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 191. 1949; Moldenke, Résumé 126 & 462. 1959.

This variety differs from the typical form of the species in being very sparsely pilose or subglabrate, its leaves being thin-chartaceous, glabrous or subglabrate and resinous-punctate beneath, ciliate along the margins, and sparsely sharp-toothed only above the middle.

The type of the variety was collected by Glieb Grüner (no. 703) at Loreto, Misiones, Argentina, on March 14, 1931, and is deposited in the Britton Herbarium at the New York Botanical Garden. The variety is known to me only from the type specimen.

Citations: ARGENTINA: Misiones: Grüner 703 (N--type).

LIPPIA SERICEA Cham., Linnaea 7: 228--230. 1832.

Synonymy: Lippia argentea Mart. ex Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97, in syn. 1877. Lantana sericea Cham. ex Moldenke, Alph. List Invalid Names Suppl. 1: 13, in syn. 1947. Lippia incana Mart. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947. Lippia sericea Cham. & Schlecht. ex Moldenke, Alph. List Invalid Names Suppl. 1: 15, in syn. 1947.

Bibliography: Cham., Linnaea 7: 228--230. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 598--599. 1843; Walp., Repert. Bot. Syst. 4: 52. 1845; Schau. in A. DC., Prodr. 11: 578. 1847; Schau. in Mart., Fl. Bras. 9: 230. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 97--98. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; Glaz., Bull. Soc. Bot.

France 58, Mém. 3: 541. 1911; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 96. 1942; Moldenke, Alph. List Cit. 1: 106, 107, 141, & 230. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 13--15. 1947; Moldenke, Alph. List Cit. 2: 364 & 486 (1948), 3: 676, 689, 709, 710, 725, 730, 856, 890, & 921--923 (1949), and 4: 1134, 1135, & 1300. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 191. 1949; Moldenke, Inform. Mold. Set 48 Spec. [3]. 1954; Moldenke, Résumé 94, 307, 310, 313, 317, & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 6: 6. 1963; Moldenke, Phytologia 12: 23, 113, & 355. 1965.

Bush, subshrub, or shrub, 0.5--1.5 m. tall, incanous-sericeous throughout; stems many, virgate, strict, mostly simple or fastigiate-branched above, issuing from an oblique nodose rhizome, tetragonal, terminated by the inflorescence, the angles rounded, the sides sulcate; leaves decussate-opposite, ternate, or quaternate-verticillate, erect-spreading, very short-petiolate, the lowest largest; leaf-blades broadly ovate (the lower ones) or elliptic (the upper ones), to almost 4 cm. long and 3 cm. wide, acute at both the apex and the base, coarsely crenate-serrulate along the whole margin or with the apex and base entire, 3--5-veined in pinnate fashion, sericeous or villous, the middle ones smaller and more or less elliptic, the upper ones shorter than the internodes, the floral ones small, still shorter, and surpassed by the flower-heads; veinlet reticulation impressed above, prominent beneath; inflorescence axillary, paired or ternate, short-pedunculate, reflexed, forming a more or less elongate verticillate almost naked raceme with much reduced floral leaves (bracts) toward the apex of the stems; peduncles 6 mm. long or longer; heads rather large, tetraquetrous-ovoid or subprismatic, finally 1.3 cm. long; bractlets membranous, suberect, imbricate, ovate, more or less acuminate at the apex, folded, carinate, sericeous-villous, subequaling the corolla-tube, lightly glandulose, villous on the outer surface with long hairs throughout (especially on the margins) from the beginning, shiny and sparsely puberulent on the inner surface; calyx 2 mm. long, bifid, sericeous-villous, shortly 4-dentate; corolla hypocrateriform, white to pale-yellow or yellow, densely puberulent on the outside, the tube straight, 5 mm. long, inflated at the middle, the limb suborbicular, the lobes rounded, the margins crisped.

The type of this species was collected by Friedrich Sellow (no. B.1441) at Fazenda da Jaguara, Goiás, Brazil [although Chamisso's original publication says only "e Brasilia. Sellow"], and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17545, but is now destroyed. The type of L. argentea was collected by Carl Friedrich Philipp von Martius (no. 1046) at Serra de Itatiaya, Minas Gerais, in April, 1839, and is deposited in the herbarium of the Botanisches Museum in Munich; that of L. incana was gathered by Johann Emanuel Pohl somewhere in Goiás, Brazil, in 1834, and is deposited in the herbarium of the Jardin

Botanique de l'Etat at Brussels.

Schauer (1847) classifies the species in his Section Goniostachyum and cites (1851) the following specimens: Goiás: J. E. Pohl s.n. [in Serra Dourada ad Agua Quente], s.n. [Caldas], s.n. [in tota via a Bomfin tum etiam ad Ponte d'Erva]; Sellow s.n. [ad praedium Facenda da Jaguara]. Minas Gerais: Lund s.n. [in campis petrosis prope Barbacena]; Martius 1046; Schüch de Capanema s.n. [Prope Villa Rica et alibi]; Vauthier 413. São Paulo: L. Riedel s.n. [in campis siccis inter Batataes et Villa Franca]. It should be noted, however, that he indicates that the Lund and Riedel collections are also from Goiás, but this seems to be an error on his part. In his 1847 publication he says "Frequens in campis Brasiliae, impromis prov. Minarum (Sell.! Pohl! Mart.!, herb. fl. bras. n. 1046, Bauth.! herb. bras. n. 413, Ried.!)" deposited in the Vienna, Leningrad, Berlin, Munich, and DeCandolle herbaria.

The species has been found on campos, dry and rocky campos, rocky grassy hilltops, and in fields, at altitudes of 700 to 1500 meters, flowering from March to July. Miss Mexia describes it as "frequent". The flowers are referred to as "white" on Williams & Assis 6190 & 6716, "pale-yellow" on Mexia 5613, and "yellow" on Macedo 2289, Mendes Magalhães 1741, and Williams & Assis 7167. Glaziou 21914 is a mixture with L. pohliana Schau.

In all, 52 herbarium specimens, including type material of all the names involved, and 17 mounted photographs have been examined by me.

Citations: BRAZIL: Brasilia: Heringer 8462 (N), 8462/556 (N). Goiás: G. Gardner 3942 (Cb); J. E. Pohl s.n. [Brasilia, 1834] (Br, F--photo, N--photo, Si--photo, Z--photo), s.n. [Brasilia, 1839] (Br, F--photo, N--photo, Si--photo, Z--photo); Sellow B.1441 [Brasilia; Macbride photos 17545] (Br--isotype, F--photo of isotype, It--photo of type, Kr--photo of type, N--isotype, N--photo of type, N--photo of type, N--photo of isotype, Si--photo of isotype, Vt--isotype, W--photo of type, Z--photo of isotype). Minas Gerais: Brade 11849 (Ja--46494), 13905 [Herb. Rio de Jan. 29532] (B); P. Clausen 613 (Cp, N, S), s.n. [Aug.-April 1840] (Br, Br, Br, Br), s.n. (N); Glaziou 15331 (Br), 21914, in part (Br); Macedo 687 (N, S), 2289 (N, S); Martius 1046 [129] (Br, Br, M); Mello Barreto 3208 [Herb. Jard. Bot. Belo Horiz. 5157] (Ja--32310, N); Mendes Magalhães 1741 (Be--14565); Mexia 5613 (Gg--336142, N, S); A. Saint-Hilaire C'.218 (N); L. B. Smith 6987 (N, Z); Williams & Assis 6190 (G, N), 6716 (G, N), 7167 (G, N). São Paulo: G. Gehrt s.n. [Pedregulho, April 10, 1920] (N, Sp--4029); N. Lund s.n. [Franca, June '34] (Cp, Cp, Cp); Riedel & Lund 2315 (N). State undetermined: P. Clausen s.n. [Brésil] (W--2383078); Damazio 272 [Caethé] (Cb); G. Gardner 4333 (N); Heringer 3670 (Z).

LIPPIA SESSILIFLORA J. G. Baker, Journ. Linn. Soc. Lond. Bot. 20: 226, in textu. 1883.

Bibliography: J. G. Baker, Journ. Linn. Soc. Lond. Bot. 20: 226. 1883; Moldenke, Phytologia 12: 56. 1965.

Baker, in the reference given above, compares his Lippia oligophylla with a "L. sessiliflora", but L. oligophylla J. G. Baker is a synonym of Acrocephalus villosus Benth. in the Lamiaceae, so there is no telling what his L. sessiliflora may be. Nothing else whatever is known to me about this plant.

LIPPIA SIDOIDES Cham., Linnaea 7: 224—225. 1832.

Synonymy: Lippia sidioides Cham. apud Hayek, Denkschr. Kaiser. Akad. Wissensch. Math.-nat. 79 (1): 295, sphalm. 1908. Lippia multicapitata Mart. ex Moldenke, Alph. List Invalid Names Suppl. 1: 14, in syn. 1947.

Bibliography: Cham., Linnaea 7: 224—225. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 598. 1843; Walp., Repert. Bot. Syst. 4: 50—51. 1845; Schau. in A. DC., Prodr. 11: 575. 1847; Schau. in Mart., Fl. Bras. 9: 224. 1851; Bocq., Adansonia 3: 244. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 152. 1895; Briq., Ann. Conserv. & Jard. Bot. Genèv. 7-8: 308—309. 1904; Hayek, Denkschr. Kaiser. Akad. Wissensch. Math.-nat. 79 (1): 295. 1908; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 96. 1942; Augusto, Fl. Rio Grande do Sul 233 & 234. 1946; Moldenke, Alph. List Cit. 1: 106. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 14. 1947; Moldenke, Alph. List Cit. 2: 366 & 533 (1948), 3: 669, 689, 837, 838, & 921—923 (1949), and 4: 1134, 1167, & 1203. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 191. 1949; Troncoso, Darwiniana 10: 72 & 86—88, fig. 7. 1952; Moldenke, Résumé 94, 314, 317, & 462. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Résumé Suppl. 7: 5 & 6. 1963; Moldenke, Phytologia 12: 23, 47, 152, 170, 203, 275, 333, 452m 454, & 455. 1965.

Illustrations: Troncoso, Darwiniana 10: 87, fig. 7. 1952.

Robust shrub, 0.8—3 m. tall, the youngest parts subsericeous-canescent; branches tetragonal, cinereous; branchlets subtetragonal, patulous, abundant, hirtellous, glabrescent; leaves decussate-opposite or ternate, variable in size; petioles short; leaf-blades oblong or ovate, 2.5—7.5 cm. long, obtuse or acute at the apex, serrulate on the revolute margins, cuneate and entire at the base, attenuate into the petiole, lineate-subrugose above, green and strigillose-pubescent above with short appressed hairs, finally scabridous, pale and opaque beneath, hirsutulous beneath or softly pilose from the first on the prominent venation, 3-nerved at the base, covered on both surfaces with shiny glands; inflorescence subsericeous-canescent; peduncles axillary, 2—6 per node, flaccid, longer or shorter than the subtending petiole, unequal in size as they develop; heads spicate, tetraquetrous-ovoid, very compact, 6—8 mm. long; bractlets membranous, lax, imbricate, ovate, acute at the apex, folded, pale, equaling the

corolla-tube, pilose throughout from the first especially on the keel and margins; calyx 2 mm. long, loosely investing the corolla-tube; corolla hypocrateriform, white, yellow in the throat, subhirtellous on the outer surface, the tube very slender, 5 mm. long, slightly ampliate above, bearing the stamens within, the limb 3--4 mm. wide, the lobes rounded, crisped on the margins.

This species was apparently based on several collections made by Friedrich Sellow (no. 1448 & s.n.) in Rio de Janeiro, Brazil, on September 24, 1818, and deposited in the herbarium of the Botanisches Museum in Berlin, where the unnumbered one was photographed by Macbride as his type photograph number 17546, but now destroyed. Chamisso, in his original publication, says that the species is based on "Sellow e Brasilia misit, speciminaque macrophylla microcephala e Buon Retiro". The type of L. multicapitata was collected by Johann Emanuel Pohl at São Lucia, Minas Gerais, Brazil, deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels and sent there in 1839 from the Vienna herbarium.

The species has been found at the edge of forests in sandstone areas and along roadsides, at an altitude of 1100 meters, flowering in March, May, June, September, October, and December. The flowers are described as "white" on Assis 221, D. A. Lima 1253, Mendes Magalhães 4317, and Williams & Assis 6807. Schauer (1847) classifies the species in his Section Goniostachyum and cites (1851) the following specimens: Minas Gerais: P. Clausen 383, Martius s.n. [in campis desertis retro flumen Jaquetinhonha (Serro Frio)], Raven s.n. [in ruderalis ad fl. Sapucahy pr. praedium S. Barbarae], L. Riedel s.n. [ad ripam fluvii das Velhas dicti], Vauthier 411. Rio de Janeiro: Sellow s.n. [prope Buen Retiro], s.n. [prope S. Ignacio]. Rio Grande do Sul: J. E. Pohl s.n. [prope urbem S. Luciae]. São Paulo: J. E. Pohl s.n. [circa Sebastianopolis]. Hayek (1908) cites Wacket s.n. [prope Ypanema haud procul ad urbe Sorocaba] from São Paulo. Troncoso (1952) records it from Misiones, Argentina.

Material has been misidentified and distributed in herbaria as L. martiana Schau. and L. origanoides H.B.K. On the other hand, the Regnell III.942 is a mixture with L. elegans Cham., and the Mendes Magalhães 1887, distributed as L. sidoides, is actually L. salviaefolia Cham.

Troncoso (1952) compares L. hickenii Troncoso with L. sidoides as follows: "Otra especie vecina es L. sidoides Cham., pero esta especie no posee las brácteas soldadas características de L. Hickenii. Esta diferencia fundamental la he podido comprobar por comparición gracias a la gentileza del Dr. F. C. Hoehne, da São Paulo, quien me envió material de L. sidoides determinado por el Dr. Moldenke y procedente de su área general típica (L. sidoides Cham., Brasil, Sao Paulo, Itú, A. Russell No. 82, X-1897; São Paulo, Sorocaba, A. Lofgren No. 248, X-1887; dupl. SI,)"

Briquet (1904) compares his L. polycephala [now regarded as a

synonym of L. salviaefolia Cham.] with L. sidoides as follows: "Ces plantes [Clausen 128 & s.n., Vauthier 411] ont été rapportées par Schauer, pour autant qu'il les connaissait, au L. sidoides Cham. Cette détermination est jusqu'a un certain point justifiée, parce que Chamisso a fait suivre.....la description princeps du L. sidoides de la description de trois autres plantes différentes rattachées par l'auteur au L. sidoides, ce qui rend son espèce peu claire. L'original de Sellow, sur lequel est basé le L. sidoides, se distingue facilement du L. polycephala par ses rameaux glabrescents, ses feuilles plus minces obtusément dentées, scabres à la face supérieure (indument velouté dans le L. polycephala), tres cunéiformes à la base, ses capitules moins nombreux, brièvement pédonculés, etc. Jusqu'à ce que des formes intermédiaires soient venues combler la lacune existante entre les L. sidoides et L. polycephala — formes que nous n'avons pas encore rencontrées dans les herbiers -- nous devons considérer les L. sidoides et L. polycephala comme des espèces distinctes."

In all, 28 herbarium specimens, including type material of all the names involved, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Minas Gerais: Assis 221 (G, N); P. Clausen 383 (Br), 615 (N), s.n. [Aug.-April 1840] (Br, Br); Mello Barreto 3312 [Herb. Jard. Bot. Belo Horiz. 2596] (N); Mendes Magalhães 4317 [Herb. Jard. Bot. Belo Horiz. 45117] (N); J. E. Oliveira 1315 [Herb. Jard. Bot. Belo Horiz. 45154] (N); J. E. Pohl s.n. [S. Luciae] (Br); Regnell III.942 [3/5/1847] (W—1322969), III.942 [25/10/1848] (W—209729, W—1322968); Williams & Assis 6807 (G, N, S). Pernambuco: D. A. Lima 1253 [49-252] (Be—80183). Rio de Janeiro: Sellow 1448 (Vt—cotype), s.n. [Brasilia; Macbride photos 17546] (Kr—photo of cotype, N—cotype, N—photo of cotype, Vt—cotype, W—photo of cotype). São Paulo: Löfgren 248 (Cp, N), s.n. [Sorocaba; Herb. Comm. Geogr. & Geol. S. Paulo 248] (Sp—15665); A. Russel 82 (Sp—20073). State undetermined: J. E. Pohl s.n. [Brasiliae, 1839] (Br); Raben 529 [547] (Br), 751 (Br), 762 (Br).

LIPPIA SIDOIDES f. FLACCIDA Hayek, Denkschr. Kaiser. Akad. Wissensch. Math.-nat. 79 (1): 295 [as "sidioides"]. 1908.

Bibliography: Hayek, Denkschr. Kaiser. Akad. Wissensch. Math.-nat. 79 (1): 295. 1908; Moldenke, Phytologia 3: 305. 1950; Moldenke, Résumé 94, 317, & 462. 1959.

This variety differs from the typical form of the species in having its peduncles elongated, 4—6 times as long as the heads, almost as long as the subtending leaves.

The type of the variety was collected by Matthias Wacket in the vicinity of Franca, Minas Gerais, Brazil, and is probably deposited in the herbarium at Vienna. Nothing is known to me of this taxon except what is given in the original description.

LIPPIA SOMALENSIS Vatke, Linnaea 43: 527--528 [as "L.? somalensis"]. 1882.

Bibliography: Vatke, Linnaea 43: 527--528. 1882; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 279--280. 1900; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 46 & 96 (1942) and [ed. 2], 110 & 191. 1949; Moldenke, Résumé 135 & 462. 1959; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 792. 1962; Moldenke, Phytologia 12: 42, 106, 230, 264, 307, 352, & 431. 1965.

Much-branched undershrub, 1--1.3 m. tall; branchlets woody, slender, very scabrous; leaves decussate-opposite, short-petiolate; leaf-blades obovate or orbicular, less than 2.5 cm. long, very rigid, obtuse at the apex, crenate along the margins, scabrous and rugose above, pubescent beneath, the venation prominently raised beneath; peduncles axillary at the upper nodes, 2-4 per node, long, stiff, ascending; heads globose, 8 mm. long; bractlets very closely imbricate, orbicular, with a large terminal cusp, the outer ones 4 mm. wide; corolla milk-white, not surpassing the subtending bractlet.

The type of this apparently rare species was collected by Johann Maria Hildebrandt (no. 1443) at 5800 feet altitude near Maid, British Somaliland. Nothing is known to me of this species except what is given in the literature.

LIPPIA STACHYOIDES Cham., Linnaea 7: 227--228. 1832.

Bibliography: Cham., Linnaea 7: 227--228. 1832; Steud., Nom. Bot., ed. 2, 2: 54. 1840; D. Dietr., Syn. Pl. 3: 598. 1843; Walp., Repert. Bot. Syst. 4: 51--52. 1845; Schau. in A. DC., Prodr. 11: 578. 1847; Schau. in Mart., Fl. Bras. 9: 230 & 307, pl. 37, fig. 1. 1851; Hiern, Vidensk. Meddel. Kjøbenh. 1877-1878: 98. 1877; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; Hayek, Denkschr. Kaiser. Akad. Wissensch. Math.-nat. 79 (1): 296. 1908; Glaz., Bull. Soc. Bot. France 58, Mém. 3: 541. 1911; Stapf, Ind. Lond. 4: 125. 1930; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 38 & 96. 1942; Moldenke, Alph. List Cit. 1: 121, 177, & 289 (1946), 2: 362, 366, 370, 534, & 553 (1948), 3: 670, 675, 689, 704, 846, 856, & 923 (1949), and 4: 1094 & 1300. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 191. 1949; F. C. Hoehne, Ind. Bibl. & Num. Pl. Col. Com. Rondon 349. 1951; Moldenke, Résumé 94 & 463. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 12: 23 & 170. 1965.

Illustrations: Schau. in Mart., Fl. Bras. 9: pl. 37, fig. 1. 1851.

Subherbaceous shrub, 0.7--1.3 m. tall, lanate-tomentose throughout, with the habit of Stachys germanica L.; stems strict, simple, terminating in the interrupted almost leafless racemiform panicle; leaves decussate-opposite or ternate, short-petiolate or subsessile, the middle ones largest, somewhat or considerably longer than the internodes, the lowest ones small, those in the inflorescence gradually reduced and verticillate; leaf-blades el-

liptic or ovate, 4—7.5 cm. long, obtuse to acute or apiculate at the apex, crenate along the margins, pinnately veined, rugose, holosericeous above, incanous beneath; inflorescence axillary, numerous, aggregate; heads short-pedunculate, tetraquetrous-subglobose to prismatic, dense, at first 6 mm. long, later elongating to 16 mm., rather thick; bractlets herbaceous, ovate, subulate-acuminate, incurved at the apex, imbricate, canescent-hirtous, subequaling the corolla-tube; calyx very short, sericeous-villous, bifid, very shortly 4-dentate; corolla hypocrateriform, red or rose to lilac or purple, sometimes white, yellow in the throat, pubescent upwards from the middle on the outside, the tube 4 mm. long, subincurved, inflated at the middle, the lobes of the limb subcrenate on the margins.

The type of this distinct species was collected by Friedrich Sellow somewhere "in Brasilia meridionali" and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17548, but is now destroyed. The species has been found on campos and dry campos and cerrado, at 650 meters altitude, flowering from October to February and in May and August. Eiten found it on cutover and burned campo cerrado, the ground plowed for planting of Pinus, the ground vegetation returning with grasses, herbs, and small shrubs, the soil poor, reddish-brown fine sand with a little clay.

Schauer (1847) classifies the species in his Section Goniostachyum and cites (1851) the following specimens: Goiás: J. E. Pohl s.n. [ad Montes claros]. Matto Grosso: L. Riedel s.n. [ad Camapuan]. Minas Gerais: J. E. Pohl s.n. [ad Ouro Fino]. São Paulo: Lund s.n. [prope Ytu]. Hayek (1908) cites Wacket s.n. from "in circuitu urbis Franca", Minas Gerais.

The flowers are described as "purple" on Eiten 1575, "white" on F. C. Hoehne Com. Rondon 1309, "red" on Regnell III.941 [Jan. 2, 1849], "rose" on Fecippe 15 and Macedo 1527, and "lilac" on Hoehne & Gehrt s.n. and Macedo 175, 176, & 1527 (in part).

In all, 29 herbarium specimens and 5 mounted photographs, including phototype material, have been examined by me.

Citations: BRAZIL: Goiás: Macedo 1527 (N, S, W—2196608). Matto Grosso: F. C. Hoehne Com. Rondon 1309 (N); Malme 2180 (S), 2180a (S). Minas Gerais: Macedo 175 (N), 176 (N, S); Regnell III.941 [Uberava, Jan. 2, 1849] (N, S). São Paulo: Black 51-11103 (Z); Edwall s.n. [Morro Pelado, Jan. 1901; Herb. Com. Geogr. & Geol. S. Paulo 5846] (N, Sp—15661); G. Eiten 1575 (W—2369599); Fecippe 15 (N); Hoehne & Gehrt s.n. [Mogy-mirim, Nov. 18, 1936] (N, Sp—36884); Löfgren s.n. [Itapetininga, Dec. 16, 1887; Herb. Com. Geogr. & Geol. S. Paulo 477] (N, Sp—15666); Regnell III.941 [9/1/1849] (W—1322978), III.941 [Canna Verde, Oct. 1855] (S, W—201126), III.941a (S); Riedel & Lund 2072 (N); A. P. Viégas s.n. [between Mogy-mirim & Campinas, Feb. 5, 1939; Herb. Inst. Agron. S. Paulo 3813] (N, Sp—42005). State unde-

termined: Lund s.n. [Febr. '34] (Cp, Cp, N--photo, Z--photo); Sellow s.n. [Macbride photos 17548] (It--photo of type, Kr--photo of type, N--photo of type, N--photo of type, W--photo of type).

LIPPIA SUBRACEMOSA Mansf., Notizbl. Bot. Gart. Berlin 9: 155. 1924.

Synonymy: Lippia violacea Moldenke, Phytologia 2: 470--471. 1948.

Bibliography: Mansf., Notizbl. Bot. Gart. Berlin 9: 155. 1924; A. W. Hill, Ind. Kew. Suppl. 7: 139. 1929; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 37 & 96. 1942; Moldenke, Phytologia 2: 470--471 & 480. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 81 & 191. 1949; Moldenke, Alph. List Cit. 3: 675 & 690. 1949; Moldenke, Phytologia 3: 305. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 94 & 463. 1959; Rennó, Levant. Herb. Inst. Agron. Minas 150. 1960; Moldenke, Phytologia 12: 211. 1965; Moldenke, Résumé Suppl. 12: 4 & 11. 1965.

Shrub, about 2 m. tall; branches stramineous or brunnescent, rather obtusely tetragonal, short-pubescent with uncinate bulbous-based hairs; branchlets much more densely pubescent with sordid-gray or cinereous hairs, virgate; nodes annulate; principal internodes 1--4.8 cm. long; leaves decussate-opposite, numerous; petioles very slender, 1--4 mm. long, densely cinereous-pubescent; leaf-blades more or less diamond-shaped or elliptic, varying to ovate, chartaceous, 1.3--2.5 cm. long, 9--15 mm. wide, acute or obtuse at the apex, regularly serrulate from below the middle to the apex, acute at the base, densely puberulent and resinous-punctulate above, very densely short-pubescent and more or less resinous-punctulate beneath; midrib very slender, subimpressed above, prominulous beneath; secondaries very slender, 4 or 5 per side, ascending, not arcuate, often subimpressed above, subprominulous beneath, not at all anastomosing, each secondary or one of its branches ending in a sinus between two teeth; veinlet reticulation obscure or subimpressed above, plane beneath; inflorescence axillary, capitate, 2 per node, 1.5--2 cm. long, mostly about equaling the subtending leaves; peduncles very slender, about 1 cm. long, densely short-pubescent with rather appressed sordid-cinereous hairs; heads densely flowered, hemispheric, 1--1.5 cm. wide; bractlets lanceolate-lingulate, about 5 mm. long and 1.5 mm. wide, strigillose; calyx about 5 mm. long, densely white-hirsute, especially on the margins and resinous-gramular; corolla violet, its tube 5--6 mm. long, rather scattered-strigillose or puberulent above the calyx, its limb about 5 mm. wide.

The type of this species was collected by Freiherr Philipp von Luetzelburg (no. 710) at Santa Maria, Pao do Moco, Bahia, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his type photograph number 17549, but is now destroyed. The type of L. violacea was collected by Geraldo Mendes Magalhães (no. 1768) on the campo between Capivari and Pico de Itambé, Serra Quebrada, municipality of Serro, Minas Gerais, Brazil, on May 3,

1942, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has thus far been found only on campos, flowering in May. Mansfeld (1924) says "Die nächststehende Art, L. hederaefolia Mart. et Schauer, ist schon an der mehr kopfförmigen, gröszeren Infloreszenz leicht unterscheidbar."

In all, 5 herbarium specimens and 4 mounted photographs, including type or phototype material of both names involved, have been examined by me.

Citations: BRAZIL: Bahia: Lützelburg 710 [Macbride photos 16549] (Kr--photo of type, N--photo of type, N--photo of type, W-photo of type); Mendes Magalhães 1768 [Herb. Jard. Bot. Belo Horiz. 41571 & 41574] (Be--14707, N, N, N, W--2124196).

LIPPIA SUBSTRIGOSA Turcz., Bull. Soc. Nat. Mosc. 36 (2): 202. 1863.

Synonymy: Lippia kellermanii Greenm., Field Mus. Publ. Bot. 2: 341. 1912. Lippia guatemalensis Gandoger, Bull. Soc. Bot. France 65: 64. 1918. Lippia strigosa Turcz. ex A. B. Seymour, Host Ind. Fungi N. Am. 588. 1929. Lippia kellermani Greenm. ex Moldenke, Prelim. Alph. List Invalid Names 31, in syn. 1940.

Bibliography: Turcz., Bull. Soc. Nat. Mosc. 36 (2): 202. 1863; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 96. 1894; Donn. Sm., Bot. Gaz. 23: 249. 1897; Greenm., Field Mus. Publ. Bot. 2: 341. 1912; Gandoger, Bull. Soc. Bot. France 65: 64. 1918; Prain, Ind. Kew. Suppl. 5: 153. 1921; P. C. Standl., Contrib. U. S. Nat. Herb. 23: 1246. 1924; A. W. Hill, Ind. Kew. Suppl. 6: 117. 1926; A. B. Seymour, Host Ind. Fungi N. Am. 588. 1929; Moldenke, Suppl. List Common Names 5. 1940; Moldenke, Prelim. Alph. List Invalid Names 31. 1940; Moldenke, Suppl. List Invalid Names 5 & 11. 1941; Calderón & Standl., Fl. Salvad., ed. 2, 238. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 17, 20--22, & 96. 1942; Moldenke, Alph. List Invalid Names 31 & 32. 1942; Moldenke, Phytologia 2: 83 & 107. 1945; Moldenke, Alph. List Cit. 1: 88 & 285. 1946; Moldenke, Phytologia 2: 330. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 14. 1947; M. C. Carlson, Bull. Torrey Bot. Club 75: 280. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 66. 1948; Moldenke, Alph. List Cit. 2: 351, 361, & 536 (1948), 3: 663, 693, 714, 817, 834, 940, 948, 959--962, & 973 (1949), and 4: 1012, 1013, & 1152. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 31, 35, 37, 38, & 191. 1949; Matuda, Am. Midl. Nat. 44: 576. 1950; Moldenke, Résumé 37, 42, 44, 45, 313, 317, & 463. 1959; Moldenke, Résumé Suppl. 2: 4. 1960; Langman, Select. Guide Lit. Flow. Pl. Mex. 748 & 1010. 1964; Moldenke, Phytologia 12: 112, 137, 263, 336, & 337. 1965; Moldenke, Résumé Suppl. 12: 2. 1965.

Small, weak tree or shrub, 1--6.8 m. tall, very viscid, aromatic; stems 5--10 cm. in diameter, glutinous; branches and branchlets more or less tetragonal, compressed at the nodes, covered with brown bark, densely pubescent with hirsute and glanduliferous hairs; leaves decussate-opposite, resinous, glutinous, with a pungent odor of Lantana when crushed, short-petiolate;

petioles 0.5—1.5 cm. long, pubescent; leaf-blades chartaceous or rough-subcoriaceous, dark-green or rich grass-green above, pale gray-green or graybrown-green beneath, ovate, 3—18 cm. long, 1.5-10 cm. wide, acuminate at the apex, crenate-dentate along the margins, cordate or abruptly contracted and obtuse at the base, bullate-rugose and scabrid-hispid above, pale and reticulate-rugose beneath, densely pubescent or hirsute-tomentose beneath; peduncles 4—8 in the leaf-axils, filiform, to 3.5 cm. long, much shorter than the subtending leaves, hirsute and glandular-pubescent; heads globose or subglobose, 12—20 mm. wide, borne in a leafy panicle at the apex of the branches; bractlets pale-green, subchartaceous, ovate or broad-ovate to subreniform, 6—10 mm. long, 5—15 mm. wide, acute or acuminate at the apex, entire, venose, glandular-pubescent on both surfaces; calyx about 2.5 mm. long, bifid, very villous and short-stipitate-glandulose; corolla hypocrateriform, white, whitish, or greenish-white to yellow, creamy-yellow, or pale-yellow fading to white, 6 mm. long, oblique, glabrous below, pubescent above.

The type of this handsome species was collected by Jean Louis Linden (no. 147) near Ijtoboli, Chiapas, Mexico. An isotype photographed by Macbride as his type photograph number 24671 is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. Lippia guatemalensis was based on several collections made by Hans von Türckheim (nos. 382, 8441, & II.715) in Alta Verapaz, Guatemala. The type of L. kellermanii was collected by William Ashbrook Kellerman (no. 6372) — in whose honor it was named — at Laguna (Lake Amatitlan), at 1200 meters altitude, Amatitlan, Guatemala, on January 20, 1906, and is sheet number 225152 in the herbarium of the Chicago Natural History Museum.

Greenman (1912) places this plant in a section "Rhodolepis", but this is probably an error in transcription on his part for Rhodolippia (Schau.) Briq. He says "Hereto are referred with some doubt the following Guatemalan specimens: Department of Alta Vera Pax, Cobán, altitude 1400 m., March, 1903, H. von Tuerckheim, no. 8441 (exsiccatae John Donnell Smith); Cobán, altitude 1350 m., February, 1907, H. von Tuerckheim, no. II.715 (hb. Field Museum). The species here proposed has its affinity with L. lupulina Cham., L. umbellata Cav., L. substrigosa Turcz., and L. mutans Rob. & Greenm., but it is amply distinct and easily recognized among all the known species of the genus on account of the large broadly ovate leaf-blade, which is cordate or abruptly contracted at the base, rugose and hirsute-hispid above and subtomentose beneath, and glandular hairs intermixed with a spreading hirsute pubescence on stems, petioles, and peduncles."

Gandoger's original (1918) description of his L. guatemalensis is "Differt a L. umbellata Cav. pube strigosa, patula omnium partium, foliis profundis serratis minusque acuminatis, umbellis villosissimis longius pedunculatis, bracteis floralibus magis cuspidatis.....Forma singularis a speciminibus mexicanis (Ehren-

berg! Schiede! Pringle n. 7714!, etc.) abhorrens indumento hispidissimo patulo, foliis atrovirentibus, pedunculis saltem duplo longioribus."

Turczaninow's original (1863) description is "Lippia caule tetragono cum petiolis pedunculisque pilis rigidis glandulosis et substrigosis dense vestito; foliis magnis breviter petiolatis acuminatis, basi in petiolum longe attenuatis, supra bullatis piliferis, subtus reticulato-rugosis dense pubescentibus pallidioribus; pedunculis axillaribus 6—8 filiformibus folio brevioribus; capitulis globosis; bracteis ovatis acutis nervoso-pubescentibus, flores omnino tegentibus." He places the species in Section Zapania.

The species has been found growing in oak-pine or dense wet pine forests, dry oak or damp pine forests, pinelands, wet ravines, and moist thickets in pine-oak forests, along roadsides, on dry slopes, dry bushy hillsides, rocky brushy hillsides, slopes with Liquidambar, Pinus, and Quercus, steep slopes with Quercus, and on streambanks. D. R. Hunt describes the species as frequent on shrubby pine ridges in British Honduras; Standley calls it common in oak and pine forests in Chimaltenango, common in dense wet pine forests in Alta Verapaz, and scarce on brushy oak slopes in Jalapa, Guatemala; while Hernandez Xolocotzi calls it dominant as secondary growth following milpas, the wood being used for roofing in Chiapas, Mexico. It has been found at altitudes of 516 to 3000 meters, flowering from October to April and in July and August, fruiting from December to April and in October. Vernacular names recorded for it are "salvia" and "salvia santa". Seymour (1929) reports that it is attacked by the fungus Prospodium lippiae (Speg.) Arth. [Puccinia lippiae Speg.]. Standley (1924) reduces L. substrigosa to synonymy under L. umbellata Cav.

The flowers are described as "white" on Breedlove 7482; "greenish-white" on P. C. Standley 64484; "creamy-yellow" on J. A. Steyermark 42594; "yellow" on Breedlove & Raven 8187, M. C. Carlson 380, Linden 147, and Williams & Molina R.23231; "pale-yellow" on Raven & Breedlove 19864, P. C. Standley 57922, and S. S. White 5271; "pale-yellow fading to white" on Skutch 1627; and "pale-green" on Williams, Molina R., & Williams 23910.

Donnell Smith (1897), in speaking of his L. substrigosa var. oxyphyllaria [which is now known as L. oxyphyllaria (Donn. Sm.) Standl.], says: "The typical form of this species [L. substrigosa] seems to be represented by the following specimens from Guatemala, which differ from the above by tetragonal branches, ovate leaves abruptly contracted into petiole, peduncles several in the axes, orbicular-ovate bractlets: nos. 2006, 4387, 4389 Pl. Guat., etc. qu. ed. Donn. Sm.; no. 3610 Nelson."

The Calderón 476 and P. C. Standley 22945 were collected on Volcán de San Salvador, which is exactly on the boundary line between the departments of San Salvador and La Libertad in El Salvador.

Material has been misidentified and distributed in herbaria under the names L. callicarpaefolia Cham. & Schl., L. callicarpaefolia H.B.K., L. chiapasensis Loes., L. graveolens H.B.K., and L. umbellata Cav.

On the other hand, the Heyde & Lux 4387, distributed as this species, is actually L. controversa Moldenke; Yuncker, Dawson, & Youse 6003 & 6387 are L. lucens Standl.; while H. Pittier 5387 and R. S. Williams 151 are L. oxyphyllaria (Donn. Sm.) Standl. and Stern & Chambers 78 is L. torresii Standl.

In the Harvard University Herbarium there are the following specimens identified as L. substrigosa, but have not been checked by me: MEXICO: Chiapas: E. W. Nelson 3114 (G). GUATEMALA: Sacatepequez: Hunnewell 14797 (G). HONDURAS: Morazán: Molina R. 3077 (G); Williams & Molina R. 17127 (G).

In all, 83 herbarium specimens, including type material of all the names involved, and 9 mounted photographs have been examined by me.

Citations: MEXICO: Chiapas: Breedlove 7482 (Z), 7744 (Ac), 8877 (Ac); Breedlove & Raven 8187 (Ac); Ghiesbreght 634 (G, Pa); Hernandez Xolocotzi C.1444 (N); Linden 147 [Macbride photos 24671] (Br—isotype, Kr—photo of isotype, N—photo of isotype, N—photo of isotype); Little & Sharp 9967 (N); Matuda 122 (Mh, Mi, N, N), 1541 (Mh, Mi, N), 2068 (A, Mh, Mi, N, N, N), 5149 (Ld); Raven & Breedlove 19864 (Ac). Tabasco: Linden 141 (Br). GUATEMALA: Alta Verapaz: P. C. Standley 69097 (N); Türckheim 382 (Br, C, G, N—photo, Pa, Z—photo), 8441 (C, G, N—photo, Z—photo), II.715 [Feb. 1907; Herb. Hort. Then. I.6032] (Br, Br, G, It, N, N—photo, S, S, Z—photo), II.715 [Jan. 1908] (N). Chimaltenango: P. C. Standley 57922 (N), 64484 (N). El Quiché: Heyde & Lux 3024 (C, G). Guatemala: J. D. Smith 1888 (C, G, Pa); Williams & Molina R. 15289 (G). Huehuetenango: Skutch 1627 (A, N). Jalapa: P. C. Standley 77203 (N). Quezaltenango: P. C. Standley 85221 (N), 85790 (N), 86624 (N). Sacatepéquez: S. S. White 5271 (Mi); Williams & Molina R. 15407 (G). San Marcos: J. A. Steyermark 36471 (F—1035157). Santa Rosa: Heyde & Lux 4389 (C, G, Mi). Zacapa: J. A. Steyermark 42594 (N). Department undetermined: Hartweg 560 (Lu); Herb. Colo. A. & M. A. Coll. s.n. (Fc). BRITISH HONDURAS: D. R. Hunt 409 (W—2398853). HONDURAS: Comayagua: Molina R. 13631 (W—2445434); P. C. Standley 56168 (A); Williams & Molina R. 12560 (G). Copan: H. Pittier 1855 (N). El Paraiso: Molina R. 625 (G). Morazán: Molina R. 1733 (G); Standley & Molina R. 4197 (N); J. Valerio Rodríguez 3645 (G); Williams & Molina R. 11986 (A), 12250 (G), 23231 (Mi, N, S, W—2398191). EL SALVADOR: San Salvador: Calderón 476 (N); M. C. Carlson 380 (Ca—703791); P. C. Standley 22945 (G, N). NICARAGUA: Matagalpa: Williams, Molina R.,

& Williams 23910 (N).

LIPPIA SUFFRUTICOSA (Griseb.) Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898.

Synonymy: Lippia geminata var. suffruticosa Griseb., Abh. K. Gesell. Wiss. Götting. 24: [Symb. Fl. Arg.] 278. 1879. Lippia subfruticosa (Gris.) D. K. ex Fradusco, Rev. Inst. Munic. Bot. Carlos Thays 2: 67, sphalm. 1962.

Bibliography: Grsieb., Abh. K. Gesell. Wiss. Götting. 24: [Symb. Fl. Arg.] 278. 1879; Kuntze, Rev. Gen. Pl. 3 (2): 253. 1898; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 106. 1904; Moldenke, Lilloa 5: 428—429. 1940; Moldenke, Suppl. List Invalid Names 5. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 43 & 96. 1942; Moldenke, Alph. List Invalid Names 30. 1942; Moldenke, Lilloa 8: 426 (1942) and 10: 343 & 380. 1944; Moldenke, Castanea 10: 42. 1945; Moldenke, Alph. List Cit. 1: 16, 84, & 92. 1946; Moldenke, Lilloa 12: 148 (1946) and 14: 46. 1948; Moldenke, Castanea 13: 118. 1948; Moldenke, Alph. List Cit. 2: 376, 378, 402, 427, & 442 (1948), 3: 661, 672, 673, 690, 804, 863, 864, & 913 (1949), and 4: 1079, 1088, 1089, & 1092. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 97, 105, & 191. 1949; Moldenke, Résumé 114, 126, 312, & 463. 1959; Fradusco, Rev. Inst. Munic. Bot. Carlos Thays 2: 67 & 69. 1962; Moldenke, Phytologia 12: 63, 100, 346, 433, & 434. 1965; Moldenke, Résumé Suppl. 12: 11. 1965.

Prostrate herb or shrub, 0.2—1 m. tall; leaves aromatic; corolla hypocrateriform, white or pink to bluish, blue-lilac, white-violet, clear-violet, or even dark-red.

The type of this species was collected by Paul Günther Lorentz and Georg Hans Emmo Wolfgang Hieronymus (no. 234) in Salta, Argentina, and was deposited in the herbarium of the Botanisches Museum in Berlin, where it was photographed by Macbride as his type photograph number 17550, but is now destroyed. The species has been found growing in fertile soil, fertile uncultivated soil, sandy or rocky dry soil, in fields, on railroad embankments, barrancas, and the tops of mountains, at altitudes of 70 to 2600 meters, flowering from November to June, fruiting in February. A vernacular name recorded for it is "salvia". The flowers are described as "white" on D. Rodriguez 1134 and A. G. Schulz 2884; "bluish" on Venturi 10323; "blue-lilac" on M. Cárdenas 3837; "pink" on Venturi 4294; "white-violet" on Venturi 2234; "clear-violet" on Venturi 354; and "dark-red" on M. Cárdenas 2470.

Material has been misidentified and distributed in herbaria under the names L. geminata H.B.K., L. pendula Rusby, and Lantana sp. On the other hand, the D. Rodriguez 234 and Herb. Inst. Miguel Lillo 32056, distributed as L. suffruticosa and so cited in Lilloa 10: 380 (1944), are actually L. recolletae Morong.

In all, 33 herbarium specimens, including type material of all the names involved, and 5 mounted photographs have been examined by me.

Citations: BOLIVIA: Cochabamba: M. Cárdenas 2470 (W—1877088),

3837 (N); Julio II.138 (W--1544263). ARGENTINA: Jujuy: Burkart & Troncoso 11099 (N); T. Meyer 16442 (N); O'Donell 4851 (N). Salta: Cabrera 3117 (N); Lillo 3842 [Herb. Inst. Miguel Lillo 32075] (N), 4474 [Herb. Inst. Miguel Lillo 32073] (N); Lorentz & Hieronymus 234 [Macbride photos 17550] (It--photo of type, Kr--photo of type, N--photo of type, W--photo of type, W--281553--isotype), s.n. [San José, beginning of Feb. 1873] (S), s.n. [II.1873] (N); Pierotti 1082 (Ca); D. Rodriguez 1134 (La). Tucumán: Bailetti 238 [Herb. Inst. Miguel Lillo 32060] (N); Peirano s.n. [La Ramada, April 2, 1933; Herb. Inst. Miguel Lillo 32895] (N); A. G. Schulz 2884 (N); Venturi 354 [Herb. Inst. Miguel Lillo 32063; Herb. Osten 17247] (N, Ug, W--1591217), 1333 (W--1591239), 1789 [Herb. Inst. Miguel Lillo 32067] (Ca--3402, N, W--1591245), 2234 [Herb. Osten 17267] (Ug, W--1591248), 4294 (N, W--1591441), 10323 (E--986714, N, S), s.n. [Herb. Mus. Argent. Cienc. Nat. 23870] (N). LOCALITY OF COLLECTION UNDESIGNATED: Herb. Jard. Bot. Brux. s.n. (Br).

LIPPIA TAYACAJANA Moldenke, Phytologia 2: 21--22. 1941.

Bibliography: Moldenke, Phytologia 2: 21--22. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 35 & 96 (1942) and [ed. 2], 73 & 191. 1949; Moldenke, Alph. List Cit. 4: 1067, 1113, & 1167. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 138. 1953; Moldenke, Résumé 84 & 463. 1959; Moldenke, Résumé Suppl. 7: 4. 1963.

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## BOOK REVIEWS

**Alma L. Moldenke**

"Manual of Cane-growing", by N. J. King, R. W. Mungomery, & C. G. Hughes, revised edition, 375 pp., illustr. American Elsevier Publishing Company, Inc., New York, N. Y. 1965. $11.00

Because I had seen well used copies of the earlier edition of this work in the hands of agricultural scientists from Cuba and Argentina, and in Hawaii, and because of my personal ignorance of the authors & their research work, it came as a great surprise to learn that this careful and newly updated work originated mainly in the famous Sugar Experiment Stations "down under" in Queensland.

For the experienced scientist, as well as the novitiate in cane agriculture, all aspects of the industry -- the plant, its soil relations, its breeding, and its enemies in the form of pests and diseases -- are carefully considered. The nature and results of modern research are well covered. The book is effectively illustrated.

"Flora of the Barbados", by E. G. B. Gooding, A. R. Loveless, & G. R. Proctor, Overseas Research Publication No. 7, xvi + 486 pp., illustr. Her Majesty's Stationery Office, London, or British Information Service, New York, N. Y. 1965. 84 sh. or $16.80

This should be a welcomed book to the literature on West Indian botany because it provides a definitive flora for the 600 recorded species of flowering plants in the Barbados, with readily usable dichotomous keys.

The plants are first keyed to families, then to genera, and finally to species. The Engler & Prantl sequence is followed, while within the families the genera and species are usually arranged alphabetically. For each species the following information is given: accepted name with its authority and original place of publication, listing of descriptions in other floras, synonymy, common names, brief botanical description, localities and collectors, distribution, and usage notes. All botanical names have been corrected in accordance with the most modern information available by Dandy, Stearn and Sandwith. This checking has added much to the value of the book because many of the native and introduced plants have a range from Florida to Trinidad, while others are almost pantropic.

The print is clear, the illustrations are very useful, and the language is scientifically accurate and yet so clearly expressed that even the interested amateur will find the book a helpful guide. The price, however, seems exorbitant.

"The Anatomy of Plants with an Idea of a Philosophical History of Plants, and Several Other Lectures Read before the Royal Society", by Nehemiah Grew, xviii + 304 pp., 19 index pp. with explanation of tables, 83 plates. Johnson Reprint Corporation [The Sources of Science No. 11], New York, N. Y., and London. 1965. $35.00

"Grew's greatness lay.....in his observations,..... in his hard-headed, empirical search for facts. Here he had no superiors. More than a century would elapse before his microscopic observations of plants would be surpassed". So declares Conway Zirkle in his introductory appraisal of this true genius, his times from the scientific standpoint, and his tool -- a microscope far cruder than that used in our present day high schools.

How wonderful it is now to be able to have in any college library and in any other educational institution this reprint, which can be handled safely by thousands upon thousands of students, enabling them to have at least a (hopefully) reverential look at what was observed through a rare instrument almost three centuries ago by one who had no published text figures to serve him as a guide.

How wonderful it is now for biologists and bibliophiles to be able to own a copy of this classic work for their own perusal!

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